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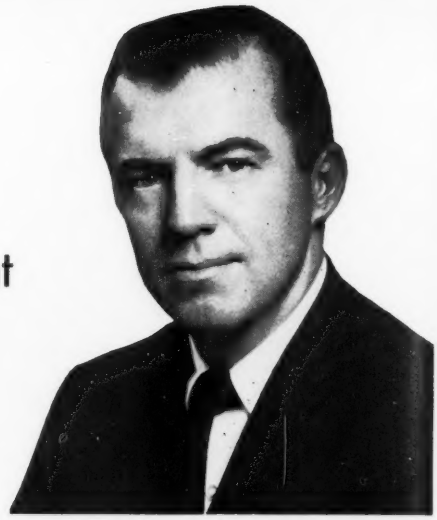
from your president



At the ad interim meeting held in Chicago in June, the Executive Council devoted much time to a discussion of the financial status of A.S.D.C. Because of a gradual increase in the costs of operating a large organization, with a view toward expanding the activities of the Central Office and committee functions, and because of an expected deficit budget this year, the Executive Council voted in favor of a dues increase. A special committee was appointed to study this need in great detail and to develop a statement which will enable the members to determine for themselves the proper course to follow. This statement appears on page 180. Due to the grave importance of this matter, each member should become completely informed and be prepared to render his decision at the next Annual Meeting in Los Angeles.

Although some of your officers are reimbursed partially for travel to official meetings, they are never compensated fully and no consideration is given to the many hours they spend in conducting the affairs of A.S.D.C. This is the way they wish it to be because of their devotion to our Society. Those members who organize and operate the Annual Meetings spend countless hours away from their practices, and are never reimbursed. These attitudes make for a great professional organization and should be understood before one makes a decision on a dues increase.

Since this will be my last message as your President, I should like to commend each of you for your good judgment in being a member of A.S.D.C., one of the most sincere, enthusiastic and fastest growing professional organizations in the world today.

W. E. Brown

Stannous Fluoride Enamel Pigmentation—Evidence Of Caries Arrestment

JOSEPH C. MUHLER, D.D.S., PH.D.*

EVERY dentist has seen the old, brown arrested lesions of dental caries found in the teeth of elderly people. These lesions usually begin early in life near the contact zones or on the facial surfaces near the neck of the tooth. They show first an opaque white spot in the enamel. When the caries process becomes arrested these areas either disappear entirely or if enough tooth substance has been dissolved to create a cavity or porosity they turn brown with the passage of time.

In every clinical test using stannous fluoride as a topical anticariogenic agent where the clinical results at the second examination were compared with the initial examination on a surface-to-surface basis and were made blind without reference to the former examination or the kind of treatment, the disappearance of lesions has been consistently observed. Originally, these observations prompted us to study extensively the caries recording methods and the techniques we were using for analyzing data obtained from such clinical caries tests. Such investigations resulted in special attention being given to the reasons for these changes in the appearance of tooth structure since the analysis of the data showed a definite pattern in their occurence in relationship to the type of treatment each group received. For example, when a group of children receive a topical application of water about 2-3 per cent of the surfaces originally diagnosed as carious change in appearance and are recorded noncarious. This is thought to be due to experimental error inherent in the clinical methods as well as to a certain small degree of caries arrestment. However, when a comparable group of children received a single application of stannous fluoride about 22-25 per cent of the surfaces originally diagnosed as carious no longer showed signs of progress of the lesion. If sodium fluoride were used there would be a slight increase in the number of changed lesions compared to the water group but nothing of the magnitude as that observed with the use of topical stannous fluoride. This suggested that the effect of stannous fluoride on carious teeth was different than that of sodium fluoride. Such findings, correlated with the clinical observations that some carious areas did not increase in size as rapidly as others, prompted us to give more attention to the subject of "caries arrestment."

Upon closer clinical examination of areas which now appeared to be sound but which had previously been considered to be incipient carious areas, demineralized areas, etchings, or frank carious lesions, it became obvious that all of them acquired certain typical characteristics: (1) the presence of pigmentation, (2) the change from a soft to a very hard texture, (3) the change from chalky whiteness to light brown, (4) no increase in size of the lesion, and, (5) no further

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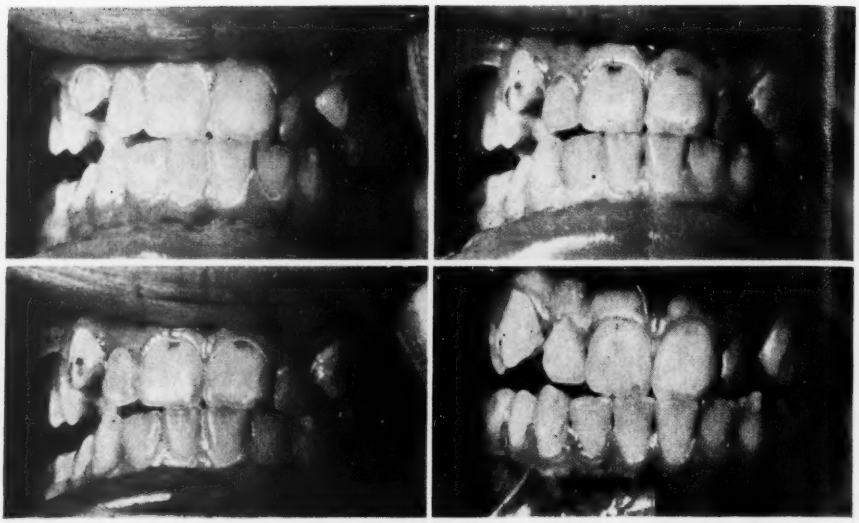

FIGURE I. *(Upper left)* Immediately following prophylaxis and single application of an 8 per cent solution of stannous fluoride. *(Lower left)* One month following stannous fluoride application. Note light brown pigmented areas on centrals and cuspids. *(Upper right)* Six months following stannous fluoride application. Note greater intensity of pigmentation as well as presence on right lateral. *(Lower right)* Two years following initial stannous fluoride treatment. Note almost complete absence of pigmentation.

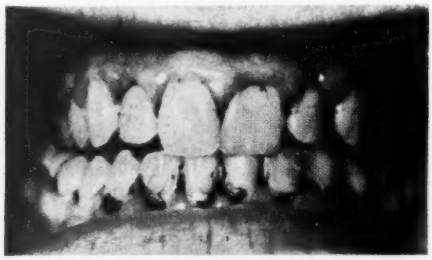

FIGURE II. Dark brown or black discoloration of carious areas following topical application of stannous fluoride in patient who refused to brush his teeth.

progress of the lesion as long as the pigmentation remained. Sound healthy enamel was highly translucent, not pigmented, hard and shiny and revealed no progressive changes as described above.

It thus appears that all of these factors are interrelated, and while we are not yet able to explain them individually we are able to measure the practical result of them in terms of caries arrestment. It is an established fact resulting from our clinical investigations that once the precarious or carious area becomes pigmented with the characteristic light brown color, the lesion will fail to increase in size. It is our belief that the smaller the size of the lesions at the time of the initial application of stannous fluoride, the greater the chance of caries arrestment.

The frequency of reapplication of topical stannous fluoride may be determined in part by the disappearance of the pigmentation. When the characteristic light brown pigmentation begins to disappear, the lesion will begin to increase in size (see Figure I). Various factors are now known which affect the duration of pigmentation and as a result, the length of caries arrestment. These may be summarized as follows:

(1) *The Frequency of Reapplication of the Stannous Fluoride.* In a highly rampant caries case, the pigmentation will usually begin to disappear after 3-4 months. In such cases, a reapplication is suggested at this time or no later than six months. In cases where the caries activity is low, the pigmentation may not begin to disappear for a year or more (see Figure I). In such cases, a reapplication is suggested about once a year. In general, the reapplication should be as frequent as necessary in order to bring the case under control.

The effect of stannous fluoride upon partially demineralized tooth structure suggests that the best time to apply stannous fluoride routinely in a dental practice is before the operative treatment is begun. The advantage of this timing lies in the fact that many of the incipient lesions which would otherwise be restored may become arrested following stannous fluoride treatment. We have followed many such arrested lesions for as long as four years and operative intervention is not yet required.

(2) *The Type of Dentifrice Used.* It is known that the light brown stannous-phosphate pigmentation can be removed by toothbrushing alone; it is removed more quickly when a dentifrice is used, probably because the phosphate abrasive in the dentifrice competes with the stannous ions in the carious enamel. The duration of pigmentation of the carious lesion can be prolonged through the use of a stannous fluoride dentifrice, which in essence provides the carious enamel with a daily topical application of stannous fluoride, thus increasing the tin content of the carious enamel. Clinical results have also demonstrated that the greatest reduction in caries activity is produced through the use of "Multiple Principles of Prevention." In particular reference to stannous fluoride, it has been shown in a two-year clinical test that the greatest anticariogenic effect comes from the topical application of stannous fluoride each six months and the daily use of a stannous fluoride dentifrice.[1]

(3) *Caries Susceptibility of the Patient.* This is, of course, related to the frequency of reapplication, and as such, has been discussed in part under number 1 above. There is evidence to support the observation that the more sus-

ceptible the patient the greater the pigmentation, but also the greater the loss in pigmentation. Frequent observation of the case and frequent reapplication of the stannous fluoride is required in rampant caries cases in order to inhibit significantly the progress of new carious lesions.

Some concern over pigmentation has been shown by a few dentists who are not aware of its clinical significance. Most of their concern is about enamel "staining" following the use of topical stannous fluoride in which the carious areas become dark brown or black. This is not the type of enamel pigmentation of which we speak when associating this phenomenon with caries arrestment (see Figure I). The unsightly dark brown to black "staining" is primarily a result of one factor: poor oral hygiene (Figure II). As reported previously,[2] there is a direct relationship between the esthetic appearance of the carious lesion following the use of stannous fluoride and the oral hygiene of the patient. Figure III is an attempt to show what happens in such cases. The initial enamel lesion probably results from acid attack upon the inorganic constituents of the enamel (removing calcium in addition to other ions). This creates porosities in the enamel and eventually a definite cavity is formed. If this tooth now receives a topical application of stannous fluoride, essentially two different reactions occur:

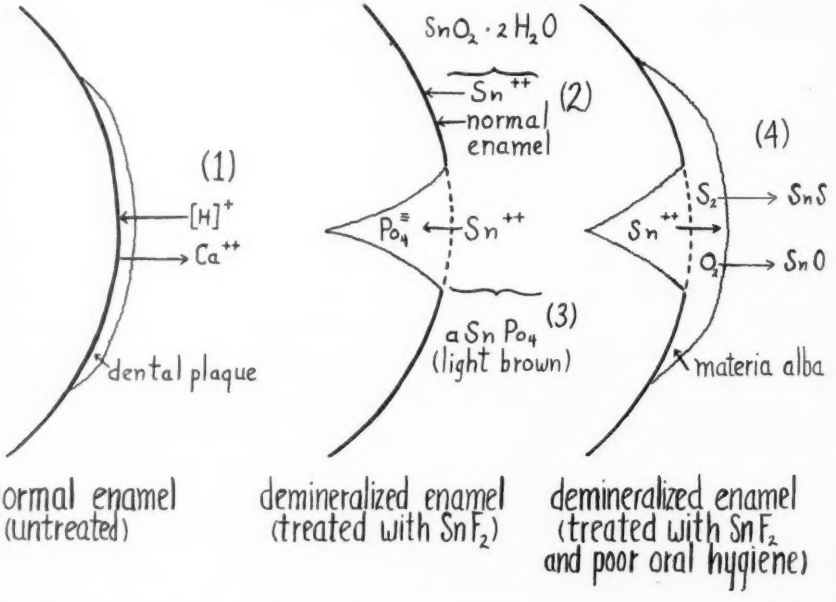

FIGURE III. Diagrammatic sketch showing reactions between stannous tin and sound tooth structure (2) and demineralized tooth structure (3). (4) Depicts the effect of materia alba covering a pre-carious area previously treated with stannous fluoride and the reactions accounting for the unesthetic appearance sometimes observed following the use of topical stannous fluoride solution.

one involves the reactions between the stannous ion and the porous enamel, and the other, between the stannous ion and noncarious enamel. In reaction 3 of Figure III it is seen that stannous ion from the stannous fluoride enters the incipient lesions to form a type of tin phosphate ($SnPO_4$). Since the precise characteristics of this combination are not known we will simply indicate it as "a tin phosphate." This product is, we believe, responsible for the caries arrestment, and is light brown in color. The reaction between the stannous ion and noncarious enamel results not in the formation of a tin phosphate, but rather a tin oxide, probably a hydrous stannous oxide ($SnO_2 \cdot 2H_2O$) (see reaction 2, Figure III). This is colorless.

Two important characteristics of the first reaction, that between the carious enamel and stannous fluoride are of considerable interest: first, considerable stannous ion remains in the lesion for varying periods of time following the topical application; and, secondly, stannous ions are constantly being removed from the carious enamel. The reasons for the loss of stannous ions were previously discussed. This constant removal of stannous ions from the carious enamel results in two important facts: (1) a loss in pigmentation; and, (2) a return of the clinical characteristics of an active carious lesion. This is one reason why we associate the two processes so completely.

Since the stannous ion is constantly being removed from the carious lesion it is possible now to explain what would happen if a person practiced poor oral hygiene following the topical application of stannous fluoride. In the microbial material covering the carious area, stannous ions would be lost from the carious enamel and react with oxygen and/or sulfur in the plaque to form a blackish-brown SnO or SnS. This is esthetically unacceptable, but can be corrected by teaching the patient to remove the microbial mass with good oral hygiene daily. This is best accomplished by having the patient use a stannous fluoride dentifrice since this will provide a double-barreled attack on the carious area, one which eliminates the plaque with oral hygiene, and secondly, it will contribute to the content of stannous ions in the carious enamel. The unsightly dark brown or black "stain" resulting from poor oral hygiene will thus be removed and the light-brown tin phosphate indicative of caries arrestment will persist as long as the patient continues to practice good oral hygiene.

One of the major advantages of the single application technique using stannous fluoride is that it is practical to repeat the treatment at six-month intervals, thus providing for early protection of the newly erupted tooth surface. Evidence is accumulating to suggest that the sooner the tooth is treated with stannous fluoride following eruption the greater is the anticariogenic effect.

NOTE: We gratefully acknowledge the assistance given us by Dr. Sumter S. Arnim, of the University of Texas, Dental Branch, in the preparation of this manuscript.

The color photographs used in this study were of cases of Miss Nancy Dudding, whose cooperation is greatly appreciated.

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The Effect of Metal Reinforcements on the Transverse Strength of Acrylic Resin*

RICHARD E. JENNINGS, D.D.S., M.S.D.**
ARNOLD M. WUEBBENHORST†

INTRODUCTION

ONE of the problems frequently encountered in the practice of pedodontics is the fracture of lower acrylic partial dentures. This fracture usually occurs in the denture near the midline lingual to the anterior teeth. Numerous opinions have been presented as to the cause of these fractures. Some have suggested that they occur as the result of slight changes due to the enlargement of the alveolar bone coincident with the migration of the unerupted permanent teeth producing an unbalanced denture with the resultant alteration of stresses. Another possibility is that there is insufficient acrylic in the lingual bar area to prevent fracture under the mastication stresses. It is also observed that children do not use the caution that they should in care of the appliance and since the midline area represents the inherent weak center point of an arc, it is susceptible to fracture.

Skinner[1] has stated that the following factors will reduce the strength of the acrylic resin denture base material: (1) reduction of the curing time; (2) water sorption, and (3) excessive heat incurred during polishing. He makes no reference to the effect of various reinforcements as related to the transverse strength of acrylic resin denture material.

A variety of reinforcing materials has been suggested by others as strengthening agents. Wasserman[2] has reported that 18 gauge wires may be imbedded in the acrylic resin to give added strength. Gainsworth[3] makes the statement that the metal wire which is so often used as a reinforcement seems to

* This project was supported in part by a Fellowship Grant from the USPHS.

** Dr. Jennings assumed Chairmanship of Preventive Dental Medicine (pedodontics) at the University of Texas Dental Branch, Houston, Texas, on July 1, 1960.

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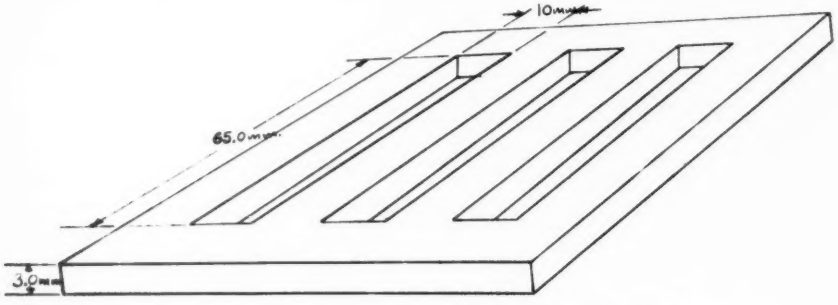

FIGURE 1. Aluminum mold used to fabricate acrylic test blanks.

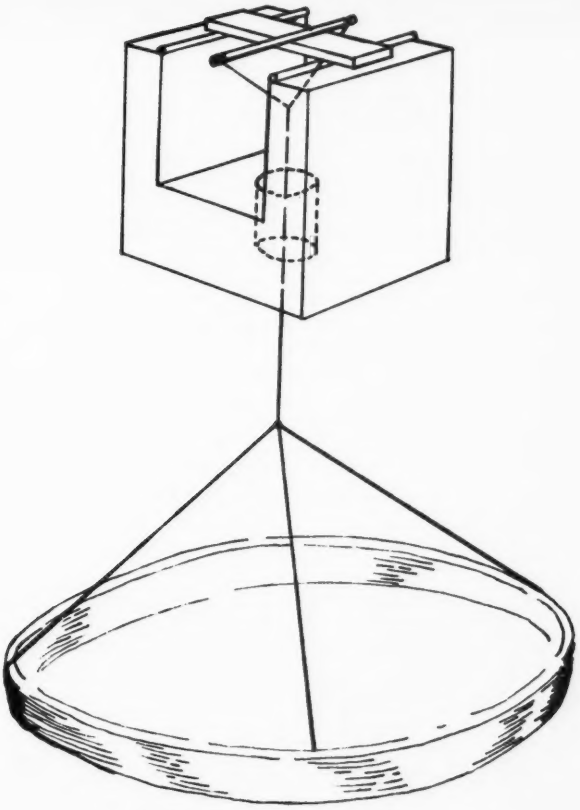

FIGURE 2. Sketch of testing jig in use.

defeat its own purpose by causing the acrylic to fracture in line with the wire.

Because of the lack of adequate information in this field and certain contradictory studies, this study was undertaken in an attempt to clarify the effect of various reinforcing materials upon the transverse strength of acrylic denture resin.

METHODS AND MATERIALS

The testing mechanism was similar to that of the recommended A.D.A. Specification procedure[4, 5, 6] for testing the transverse strength of denture base resin.

A sheet of aluminum 3.0 mm. thick was used to fabricate a mold in which three acrylic testing blanks of similar size were cured at one time.

Each series of three test strips was prepared from the same mix of acrylic,* cured simultaneously by bringing the water bath temperature uniformly up to 212° F. in one hour, holding at 212° F. for one-half hour and then bench cooling. The blanks were then removed from

* Miratone, L. D. Caulk Co.

the molds and any flash was removed by a slowly revolving metal bur. The blanks were then stored in water at room temperature for at least 7 days until tested and they were kept moist during testing by the use of a water spray.

A testing jig to conform with that described in the A.D.A. Specification No. 12 was prepared and used in the testing procedure.

The acrylic test blanks were pencil scribed with two lines 7.5 mm. from each end to facilitate proper centering on the testing jig. A center line was also scribed to aid in centering the stress applying rod. The initial static load of one pound was suspended from the stress applying rod for a period of 30 seconds and then one pound of lead shot was added at a uniform rate during the next 30 seconds.

Thereafter, one pound of lead shot was added during the last 30 seconds of each minute and the total amount of weight needed to fracture the specimen was recorded. The linear deflection of the specimen was not recorded, as only the load necessary to produce the fracture was of interest to this study.

For the initial study a series of 21 acrylic blanks without added reinforcement was prepared and tested. The results are shown in Table 1.

For the second phase of the study a total of 18 series of specimens was prepared. Each series of three acrylic blanks was prepared as follows. The first was unreinforced and the second blank had an added reinforcement of a stainless steel lingual bar (Williams Gold Refining Co.). The reinforcement was centered in

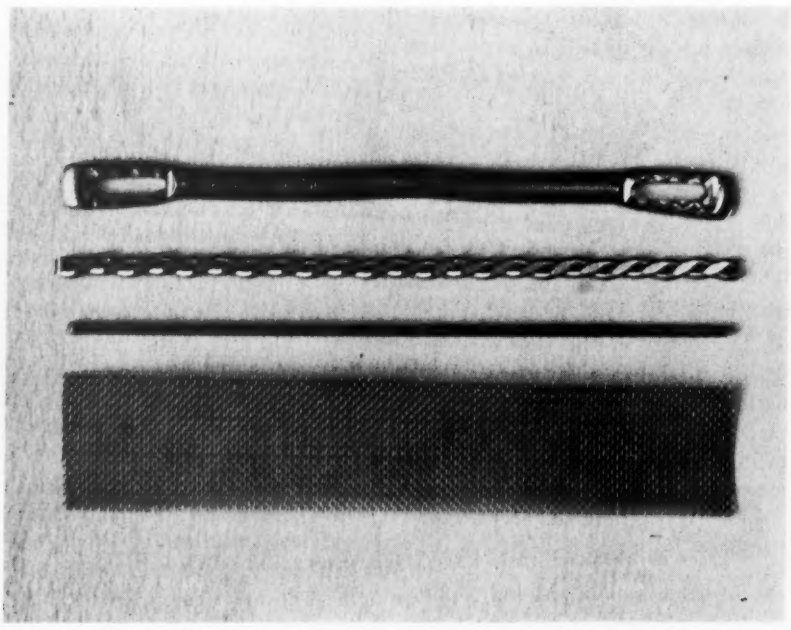

FIGURE 3. Reinforcements used in this study (stainless steel lingual bar, braided wire plate strengthener, .040 stainless steel round wire and stainless steel mesh).

the test blank by visual means during the trial packing of the acrylic resin material.

The third was reinforced with a 60 mm x 8 mm strip of stainless steel mesh (Precision Dental Mfg. Co.). The results are shown in Table 2.

TABLE 1
UNREINFORCED ACRYLIC BLANKS

25*	28*	29*
26	28	29
27	29	29
27	29	30
27	29	30
27	29	30
27	29	30

* Indicates weight in pounds necessary to produce a fracture of the acrylic specimen.

In the final group, 10 series of 30 blanks were prepared with the first blank of each series being plain acrylic, the second reinforced with a braided wire plate strengthener (Wm. Dixon, Inc.), and the third reinforced with a .040 stainless steel round wire. The results are shown in Table 3.

TABLE 2

	Plain	*Bar*	*Mesh*
1	24*	39*	29*
2	29	35	28
3	27	31	27
4	27	29	26
5	27	26	26
6	27	31	26
7	32	34	33
8	27	36	27
9	27	30	28
10	26	34	27
11	27	34	26
12	28	32	27
13	26	31	27
14	25	35	26
15	27	35	27
16	25	32	25
17	25	33	25
18	27	30	26

* Indicates weight in pounds necessary to produce a fracture of the acrylic specimen.

TABLE 3

	Plain	*Braid*	*S.S.*
1	27*	27*	28*
2	32	34	35
3	27	18	32
4	26	27	32
5	28	27	34
6	28	29	33
7	27	33	33
8	26	30	33
9	32	32	34
10	24	26	27

* Indicates weight in pounds necessary to produce a fracture of the acrylic specimen.

Presentation of Data

In the initial group of 20 acrylic blanks that were not reinforced, the weight necessary to produce the fracture varied from 25 to 30 pounds (Table 1). The mean was 28.29, the median 29 and the mode also 29 pounds (Table 4).

In the group of 54 acrylic blanks where the comparison of plain versus the stainless steel lingual bar and stainless steel mesh reinforcements was made (Table 2) the results were as follows: the range of weight required to fracture the unreinforced (plain) specimens was 24 to 32 pounds. The mean was 26.83, the median and mode were both 27.0 pounds. The range of weight required to fracture the specimens containing the stainless steel lingual bar as a reinforcement varied from 26 to 39 pounds. The mean was 32.61, the median 32.5 and the multi-mode was 31, 34 and 35 pounds. The range of weight required to frac-

ture the specimens reinforced with the stainless steel mesh was 25 to 33 pounds. The mean was 27.0, the median 27.0 and the mode 26.5. These results were shown in Table 4.

TABLE 4

	Range	*Mean*	*Median*	*Mode*
Table 1	25-30	28.29	29.0	29.0
Table 2				
Plain	24-32	26.83	27.0	27.0
Lingual Bar	26-39	32.61	32.5	31, 34, 35*
S.S. Mesh	25-33	27.0	27.0	26.5
Table 3				
Plain	24-32	27.2	27.0	27.0
Braid	18-34	28.3	27.0	27.0
.040 S.S. Wire	27-35	32.1	33.0	31.0

* Multi-mode

In the next series of 30 specimens prepared to compare the results of the unreinforced blanks to the braided wire and .040 stainless steel wire reinforcements (Table 3) the results were as follows: the range of weight required to fracture the unreinforced (plain) specimens was 24 to 32 pounds. The mean was 27.2 pounds and the median and mode were 27 pounds. The range of weight required to fracture the specimens reinforced with the braided wire was 18 to 34 pounds. The mean was 28.3 and the mode and median were 27 pounds. The range of weight required to fracture the specimens reinforced with .040 stainless steel wire was 27 to 35 pounds. The mean was 32.1, the median 33.0 and the mode 31.0 pounds (Table 4).

Because of the small number of specimens used and because of the variation revealed in the range of weight required to fracture the various specimens, only the three specimens processed at the same time were considered for this final analysis. No attempt to compare the results of one series of three to another series was made. In this way it was felt that variables introduced during preparation of the specimens would be further reduced.

The statistical tests used were an analysis of variance for repeated measurements of the same specimen to determine the significance of variation among treatments and among specimens and the Newman-Keuls Sequential Range Test to determine the significance of differences among treatment means.

The stainless steel lingual bar was significantly stronger than both the stainless steel mesh and the unreinforced blank. In both cases the differences were statistically significant beyond the 1 per cent level of confidence. The difference between the stainless steel mesh and the unreinforced blank was not statistically significant. The difference in strength from one specimen to another where the results for the three conditions were pooled was statistically significant at the 5 per cent level of confidence. Another evidence of superiority of the lingual bar reinforcement was that in 17 of the 18 specimens the bar was the strongest of the three treatments.

The .040 stainless steel wire was significantly stronger than both the braided wire reinforcer and the unreinforced blank. In both cases the differences were statistically significant beyond the 1 per cent level of confidence. The difference between the plain blank and the braided wire reinforced blank was not statistically significant. The difference among specimens was significant at the 1 per cent level of confidence. In nine of the

ten specimens, the .040 stainless steel wire was the strongest of the three.

Discussion

Of the four strengtheners tested, only two, the lingual bar and the stainless steel wire increased the transverse strength enough to be statistically significant. The clinical application of this would seem to be that the 12 per cent to 18 per cent increase in strength imparted to the material may justify the routine inclusion of certain strengtheners in acrylic space maintainers. However, there are many other factors, such as processing strains and polymerization shrinkage, thermal contraction, ductility and tensile strength which are involved in the ultimate strength of the finished denture, as evidenced by the variation among untreated specimens. It should also be pointed out that perhaps the increase in transverse strength shown here may not be of sufficient magnitude to produce results during a clinical trial.

Summary

The investigation was concerned with the effects of four commonly used reinforcements. A standardized test was designed to conform as near as possible to the A.D.A. Specification No. 12 for denture base resin in order to evaluate the load required to fracture various specimens.

Two of the reinforcements (stainless steel mesh and braided wire plate strengthener) tested showed no significant increase in the tranverse strength of the acrylic resin employed. However, the other two strengtheners (stainless steel lingual bar and .040 stainless steel wire) did significantly increase the transverse strength of the material. The ap-

ANALYSIS OF VARIANCE

Plain—S.S. Lingual Bar—S.S. Mesh

Source of Variation	*Degrees of Freedom*	*Sum Square*	*Mean Square*	*F*	*Per cent Level of Significance*
Treatments (T)	2	470	235.00	78.33	1
Specimens (S)	17	125	7.35	2.45	5
T x S	34	102	3.00		
Total	53	697			

ANALYSIS OF VARIANCE

Plain—Braided Wire—.040 S.S. Wire

Source of Variation	*Degrees of Freedom*	*Sum Square*	*Mean Square*	*F*	*Per cent Level of Significance*
Treatments (T)	2	134	67.00	14.19	1
Specimens (S)	9	221	24.56	5.20	1
T x S	18	85	4.72		
Total	29	440			

parent inference of the above paragraph is that the use of certain materials will enhance the transverse strength of acrylic resin space maintainers, but it must be kept in mind that other factors are also involved in the problems of fracture of these appliances.

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Report of Three Patients Experiencing Juvenile Periodontosis and Early Loss of Teeth*

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PATIENT NO. 1

Present Illness

LINDA K. was first seen at the Eastman Dental Dispensary during the summer of 1951 when she was 3½ years old. Ectodermal dysplasia with oligodontia were noted along with extensive carious lesions. Linda was seen next in February 1958 as one of a group of allergic patients who were referred by their physician for oral evaluation. At that time, both a history and an examination were completed.

Past History

Developmental Survey: Linda was delivered without incident on December 23, 1947, at the end of a normal pregnancy. Her mother was 35 years of age. Early in infancy, an eczematoid rash prompted the diagnosis of allergy. A search for allergens, begun then, has continued to the present time with occasional new findings. Linda now is known to be allergic to many materials and her allergic manifestations include asthma as well as dermatitis. Ectodermal dysplasia was noted by the sixth month.

Growth and Development: Linda grew steadily, if slowly, during infancy and childhood. The part that her illness may have had in determining her slight physique is not known. At one time, Linda was regarded as "slow"; however, this opinion was withdrawn as she grew older and her loss of hearing was partially corrected. The dysfunction of her eighth nerve was stated to be congenital and her loss of hearing was rated as high as 80 per cent. It affected the middle frequencies which are common in speech; consequently, Linda's speech was impaired. No functional disorder of the organs of speech was demonstrated. Linda's physical, mental and emotional growth were adequate in spite of her disabilities. She desired to look her best and managed a manner of composure and friendliness which was very agreeable. Her composure was inadequate to cope with the stress of a dental appointment, however, and she experienced severe anxiety on such occasions.

Medical Survey: The only common childhood disease had been a mild attack of measles at the age of eight years. Apart from her severe allergies, loss of hearing and ectodermal dysplasia, there were no other known illnesses or anomalies. The mother stated that Linda's hair was thicker than formerly and that she seemed to sweat more. Her skin was dry and showed two types of nodular elevations. On the extremities, there were firm erythematous, fixed pea-sized nodules and over her neck, head and parts of her face, there was a widespread keratosis pilaris. Her fingernails were doubly convex and the ends of her fingers showed clubbing (so called hippocratic fingers, which was attributed to

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the pulmonary embarrassment encountered during her frequent asthmatic attacks.

Linda had been treated with a wide variety of external and internal medications. At the time of writing, she appeared to be helped the most by antihistamines, corticosteroids, mild weather and not too frequent bathing.

Family Survey: Both parents were living and well as was a 14-year-old brother. There were no significant illnesses or anomalies in the rest of the family.

Oral and Dental Findings: In 1951, when she was 3½ years old, Linda was known to have ectodermal dysplasia and oligodontia. There was no record of observations of oral muscosa, gingiva or skin. Radiographs of the mandibular molars obtained at that time were of poor quality and of little predictive value.

In 1958 when Linda was seen again, dramatic departures from the normal were evident in the skin and gingival tissues. There was an ulcerated thickening of the gingival margins, marked recession and extremely deep pockets about all teeth. Mrs. K. pointed out that her dentist had observed Linda from time to time and that it was from him that she first learned of the dental condition.

Linda had a normal number of primary teeth which erupted within normal times, chronologically, but which rapidly became carious. The first permanent molars, which erupted at six years of age, required restoration within a few months. The only other permanent teeth were the maxillary central incisors and cuspids and the mandibular cuspids. The middle lobes of the maxillary incisors appeared to have formed at right angles to their normal positions and a defect at the point of union of all three lobes had become carious and was restored. The deformity of the mandibular cuspids rendered them sharply constricted and "needle-like," in appearance. The roots of all teeth appeared short and blunt and were surrounded in most instances, by a thickened periodontal space. The lamina dura were variable, being very dense in some areas and disappearing or blending with the alveolar bone in others. There was extreme mobility of the lower primary incisors which had undergone little or no root resorption. The permanent molars were slightly mobile. Linda had not complained of pain, but mastication was unsatisfactory. Occlusion was difficult to evaluate because of the loss of teeth; however, her face was not grossly distorted by what appeared to be a reduced vertical dimension. There was no clear evidence of occlusal trauma, bruxism or other injurious habits. During her frequent asthmatic periods, she breathed principally through her mouth.

Cephalometric radiographs begun in 1958 had not yielded any useful information at the time of writing.

Attempts to improve the oral condition through conservative periodontal care and oral hygiene met with little success. Linda's mouth appeared cleaner and decalcification of gingival areas of the teeth appeared to stop, but that was the extent of improvement.

Surveys of Linda's diet by her pediatrician and the Clinic failed to disclose a dietary deficiency. Therapeutic administration of vitamins A, B-complex and C had been undertaken singly and in combination without improvement before Linda came to our attention.

On November 12, 1958, the primary mandibular left central incisor was removed along with a bit of tissue for his-

tological examination. Subsequently, Linda's dental care was completed by the insertion of maxillary and mandibular partial dentures of acrylic and wrought wire. The dentures have been worn constantly. They appeared to function well and, except for two adjustments to relieve pressure over the incisive foramen, have been tolerated well by the tissues.

Report of Biopsy: Examinations of the specimens of soft tissue were completed at the Armed Forces Institute of Pathology by J. L. Bernier and at the Dental School of the University of Minnesota by Robert J. Gorlin. The reports concur with the clinical observations that the specimens were not significantly different from others of periodontal disease. There was some epithelial dysplasia as well as proliferation and a mild chronic inflammation of the connective tissue. The small piece of bone included was not remarkable.

There was no evidence of occlusal trauma, bruxism or other injurious habits. Examination by H. A. Zander and the investigator of decalcified serial dental sections revealed that little, if any, secondary cementum had been deposited on this primary incisor which had been in place for four years longer than normal. There were several areas of resorbed cementum which had been filled with calculus. Thin layers of calculus could be demonstrated on the cementum throughout the depth of the pocket down to the apex of the root. There were numerous areas of interglobular dentin throughout the root. The pulp, which was severely injured at the apex, contained a densely fibrosed layer, just above this damage, that separated it from the remaining normal pulpal tissue coronally. The condition of the surface of the root was similar to that found accompanying severe periodontal disease in adults, except that the cementum was thin throughout.

Linda K., thus, presented a syndrome of severe anhidrotic ectodermal dysplasia, allergy and severe periodontal disease not inconsistent with a diagnosis of periodontosis and secondary inflammation.

Patients Nos. 2 and 3

Present Illness

Michael D., age three years, and his sister, Ann Marie, age six years, were referred by their pediatrician for oral evaluation because of premature shedding of their primary teeth. The children first were examined in October 1958.

Past History

Developmental Survey: Both children were delivered spontaneously at the end of normal pregnancies. The mother was in her twenties at the time of both births. Both children have developed normally except for the appearance of erythema and painful cracking of their palms and soles at about 12 months.

Growth and Development: Both children were well within the normal limits of weights and heights for their ages. They both were alert, active, responsive children of apparently better than average intelligence.

Medical Survey: Both Michael and Ann Marie had been remarkably free from childhood disease. There was no history or evidence of allergy. There had been no illnesses or anomalies except those of the skin, periodontium and teeth. Both children showed similar dermal changes which included hyperkeratinization of soles and palms as well as

knees and elbows, all of which, it should be pointed out, are weight-bearing areas of the body. There was also some desquamation from their eyelids, cheeks and labial commissures. Hair, nails, hearing, vision, sweat and sebaceous glands were normal in both children, in fact, they both had thick hair. They had dark body-hair widely distributed. They were not discomforted by warm weather, but did have profuse nightsweats regularly. They often went barefoot at home even in cold weather because of burning sensations in their feet. An extensive number of medications had been used for these children without altering their disease. There seemed to be a slight improvement and the children were more comfortable recently in the summer. No medications were being used at the time of examination.

Extensive evaluations of the blood and urine had been made repeatedly for both children and always had been well within the normal limits of findings. At the time of the current examination, blood-glucose, total protein, calcium, phosphorus and alkaline phosphatase, and urinary mercury were found to be normal. Radiographic surveys of the long bones one year earlier had revealed nothing.

Family Survey: Both parents were living and well and except for the condition that the mother described as her own "dry skin," they both had normal skins, intact dentitions and the unpretentious beginning of periodontal disease found in the average young adult. The only other child was an 8½-year-old brother who was overweight, but otherwise in good health with a non-carious dentition and healthy periodontal structures. His occlusion was normal. It may be significant that the parents of these children were first cousins.

Oral and Dental Findings: By the time each child was two years old, oral changes had advanced to the point at which a lower incisor had been exfoliated. From that time, the primary teeth continued to be shed until at the age of 3½ years, Michael had only four primary cuspids and four primary second molars remaining. All of these teeth showed marginal gingival enlargement and ulceration and deep pockets which had preceded the loss of the other teeth. In both children, the first tooth was lost either just before or just after a time when the mouth was very sore and the teeth were coated with "pus." There was considerable nervousness and agitation at that time and the children were found to adopt unusual postures in bed, for example, head down between their spread legs.

Ann Marie already, at the age of six years, had erupted her first permanent molars and all of her permanent incisors and her mandibular cuspids were partially erupted. The gingival tissues were enlarged, edematous and ulcerated. Extremely deep pockets encircled all teeth including those in the process of eruption. The mandibular incisors were very mobile. There were wide diastemata separating the incisors, some of which were tipped. Loss of bone similar to that expected with an infra-bony pocket was most pronounced about the incisors. The periodontal space was somewhat thickened about the erupted teeth, which appeared to be well formed and were of normal size; indeed root formation of the incisors and molars was advanced. There was no evidence of oligondontia. Ann Marie's first permanent molars had become carious, had been restored and then had developed new caries.

There was no evidence of occlusal trauma, bruxism or other injurious habits. On November 12, 1958, Michael's mandibular right primary lateral incisor was removed along with a bit of tissue for histological examination. A specimen of soft tissue also was examined together with that from Linda K., by Col. Bernier and Dr. Gorlin. The findings essentially were the same as for Linda K., but there appeared to be a somewhat thicker epithelial layer of cells. There was no unusual keratinization.

Serial sections of the decalcified tooth showed that considerable resorption of cementum and dentin had occurred in the apical third of this young primary incisor. Some areas of resorption had been repaired by deposition of cementum while others were covered with thin layers of calculus which was found on the cementum down to the apex of the root. Little resorptive damage was evident in the gingival area where the radicular surface showed layers of secondary cementum which was covered in places by thin layers of calculus. The pulp was similar to that of Linda K. and showed a damaged apical area separated by a fibrosed region from the more normal pulpal tissue coronally.

In July 1959, after a slight regression of inflammatory changes which apparently had been produced by brushing, a gingivectomy was performed around Ann Marie's maxillary incisors. Direct examination of bone and cementum at that time showed extensive destruction of bone and replacement by a dense connective tissue. The cementum exhibited a glassy smooth hard surface. Histological examination of the tissue from the gingivectomy revealed a non-specific chronic inflammation. Healing following the gingivectomy was uneventful and the tissues were slowly returning to their former state of chronic inflammation.

Discussion

The three histories presented illustrate two widely different diseases of the skin with the simultaneous occurrence of periodontal disease leading to the loss of primary and permanent teeth.

Ectodermal dysplasia, as in patient No. 1, with its well-known oral stigmata which were so well catalogued by Young[42] may affect any of several combinations of the ectodermally derived structures. These changes may, in turn, alter structures and organs of which the ectoderm is a part. The periodontium ought to be included in any listing of structures which may be so affected since it contains tissue of ectodermal origin. However, as with several of the other stigmata of ectodermal dysplasia, the periodontal changes are not indispensable features of the syndrome.

The skin and oral lesions of patients Nos. 2 and 3 are similar to those reported by Woods and Wallace,[42] Rosenthal[30] and Dekker and Jansen,[10] therefore, a diagnosis of hyperkeratosis palmo-plantaris accompanied by periodontosis has been assigned. The differential diagnosis of hyperkeratosis must consider such conditions as Meleda's disease,[35] A dyskeratosis congenita,[7] sclerodermoform keratosis,[2] eosinophilic granuloma,[15] pachonychia congenita[17] and the hypophosphotasemias described by Illingworth[21] and Sobel;[33] however, in the latter patients, resorption of primary teeth had begun. The description by Harndt[19] of a syndrome of periodontosis, blue discoloration of soles and palms, erythredema and polyneuropathy seems closely akin to another of the skin affectations, acrodynia or pink disease, which has

been described many times. Included among these descriptions are those of Anderson[1] and Bivings.[3] The excellent review by Cheek[6] related acrodynia to diseases of electrolyte-depletion. Williams, et al.,[41] also subscribed to the electrolytic theory of etiology of acrodynia. Debre and Nevot,[9] in 1939, pointed out the similarity of ergotism, acrodynia and pellagra. Holzel and James[20] enumerated several weaknesses in the mercurial etiology of acrodynia, whereas Fischer and Hodes[14] offered the limited evidence of one patient to support it. Silverman and Cassady[32] have described follow-up oral findings in acrodynia similar to those described by Debre and Cleret.[8] Warkany and Hubbard[39, 40] who have reported the most recent American experience with this condition, accept mercurial poisoning as its cause and have come to the conclusion that "In spite of the diagnostic uncertainties, the syndrome is well established as a disease entity." Van Creveld and Paulsen[38] also have described the condition.

It is not at all clear from the literature that all instances of acrodynia are identical and there are many interpretations of the importance of factors associated with its etiology. It is an understatement of the situation to say that there is no agreement on which findings in blood or urine represent causes and which represent effects of the disease. It would not be surprising then, in view of the "diagnostic uncertainties" just mentioned, if some instances of hyperkeratosis or neurotrophic dermatitis were to be labelled acrodynia. In fact, patients Nos. 2 and 3 still are diagnosed as experiencing acrodynia by at least one pediatrician.

There are, in addition, a number of other dermatologic conditions which bear some similarity both to hyperkeratosis and acrodynia. In the first place, as Findlay pointed out,[12] the term hyperkeratosis comprises a variety of processes and, he added, "as a general confession of ignorance it is said that there is an individual tendency to develop corns and calluses, but apart from this, the one recognized etiological factor is pressure." Rothman[31] also reviewed the subject of pressure and keratinization and came to the same conclusion to which he added data on the effect of estrogens and vitamin A which mediate hyperkeratinization. Of considerable interest is his reference to a report that a deficiency of pyridoxine can produce acrodynia in rats; he also described an acanthosis caused by a deficiency of zinc.

In other sections of his outstanding publication, Findlay[13] described buccal leukoplakia, the keratoderms of Unna and Thost and acrokerstosis verruciformis and included the thought that "the only practical conclusion to be drawn is that the most striking process must give its name to the patient's disease, though this may have to be changed as the manifestations change."

Mitchell-Heggs[24] discussed the heat-regulatory function of the skin of the limbs and attempted to relate it to the hyperhidrosis of patients with hyperkeratosis. He pointed out the acral signs of the early onset of circulatory disorders and related these signs to the erythema which precedes hyperkeratinization. Stratton[34] has divided keratoses into a symptomatic form produced by arsenic which he distinguished from the essential forms, i.e., keratoderma punctata (Hallopeau) and keratoderma palmaris et plantaris.

The literature on periodontosis is as confused as that on acrodynia and hyperkeratosis and largely for the same lack

of clearly presented criteria for the use of the appellation. The term has several meanings and one learns what some investigators have accepted it to mean only after laborious examination of the literature. An example is to be found in the patient described by Mueller and Rony[25] and Mueller[26] which has been termed by some as an instance of a periodontosis although the principal lesion was a rapid widespread resorption of the root. Another example of changing definitions in terms of changing science is suggested by the Japanese instances of periodontitis in acatalasemia discussed by Englander.[11] If the patients had been ill before a test for catalase had been developed, their illness might have been called cancrum oris or noma. Little information can be listed by confining one's efforts to articles written since 1950 when a semblance of consistency began to appear in the English literature.

The periodontal disease described in all three of the patients reported, is in no way significantly different from that described in adults by Karshan, Tenenbaum and Beube[22] and Tenebaum, et al.,[36] and, as Robinson[29] has pointed out, "There are no typical pictures of children with periodontosis associated with different systemic factors. Whether the cause is diabetes, hypothyroidism, vitamin deficiency, Hodgkin's disease, disturbance of the gonadotropic hormones or a genetic factor, the bony changes are the same in all periodontosis." Glickman offers substantially the same opinion[16] when he states that "The concept is untenable that there is a systemic type of periodontal disease that invariably presents certain clinical features without which a diagnosis of periodontosis cannot be made."

The patient described by Cawson[5] exhibited oral lesions apparently identical with those of the reported patients Nos. 2 and 3, but with no evidence of skin or systemic disease and the description tends to substantiate the opinion expressed by Glickman and Robinson.

Periodontosis has been defined as a periodontal disease which exhibits "degenerative changes in periodontal membranes, loss of alveolar bone, spontaneous wanderings, late pocket formation and inflammation absent until after pocket formation."[23]

This definition appears to have resulted from the usual compromise of differences of opinion such as those cited by Zappler in 1948[44] who noted Box's labelling of the condition as an inflammatory pericementitis fibrosa while Orban and Weinmann[27] designated it as a degenerative non-inflammatory state. Gottlieb,[18] who was one of the earliest writers on the condition, thought it to be non-inflammatory cementopathia, whereas Thoma and Goldman[37] pointed out the importance of cellular or vascular resorption of bone.

Conclusions

Out of the preceding "potpourri" of opinions and facts, it seems possible to extract a few acceptable conclusions:

1. The first is that one is not justified in explaining what is not understood in one condition in terms of what is not known in another, and hence, cannot state that hyperkeratosis or ectodermal dysplasia produce periodontosis simply because they occur simultaneously.

2. The second conclusion is that in both skin and periodontium, many different factors can be found to produce a characteristic change which does not necessarily begin and end always in the same tissue. Each structure seems to possess its own scope of reaction, since as Robinson pointed out, "the bony

changes are the same in all periodontosis." Bony changes, of course, are not the primary and only changes which develop.

3. The third and last conclusion which seems justifiable is that while no distinct "systemic form" of periodontosis has been proved, neither has it been proved that all periodontosis is caused by purely local factors.

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Do Fractured Incisors Migrate?

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IT is obvious that protruding incisors are more prone to injury than normally positioned ones. Lewis (1959) showed that fractures occurred twice as frequently in children with protruding teeth (26 per cent) than in those with normal teeth (12 per cent). This study suggests that an inverse relationship can also exist, i.e. that a normally positioned incisor may move into a protruded position *after* the crown has been fractured. Two cases were seen in which the parents stated positively that the fractured tooth had been in normal position before the accident and had moved into its present protruded position only after the accident (Fig. 1A).

Figure 1 (Top) Model showing protrusion of the upper left central incisor *after* the incisal third was fractured. (Middle) Model showing closure of space after the upper right incisor was extracted. (Lower) Model showing closure of space after loss of both upper central incisors.

There is no doubt that the position of the upper incisors is influenced by the action of the perioral musculature—especially the lower lip. Figure 2 attempts to analyze the changes in the muscular environment when part of the incisor crown is lost. When the incisal third of the crown is fractured off, the pressure of the lower lip against the tooth ceases. The lingual forces are then unopposed, with the result that the tooth is liable to be pushed labially.

Another factor now enters the picture. Once the proximal contacts are broken, the tendency towards labial protrusion is aggravated by the mesial drifting of the adjacent teeth. The strong tendency to close the space after the loss of a permanent incisor is well known and illustrated in Figure 1B. This tendency towards mesial drift by adjacent teeth should also operate when the incisor is pushed out of the contact line. After fracture of the crown, the protruding incisor is displaced even further towards the labial because the restraining influence of the lower lip is lost (Fig. 2).

Although the discussion presented above is logical, the author cannot document this hypothesis with models taken before or soon after tooth fracture, and then later after labial drifting. The purpose of this discussion is to call attention to the possibility that upper incisors may become protruded *after* the incisal third has been fractured. It is urged that pedodontists review their records and current patients to test this hypothesis. If

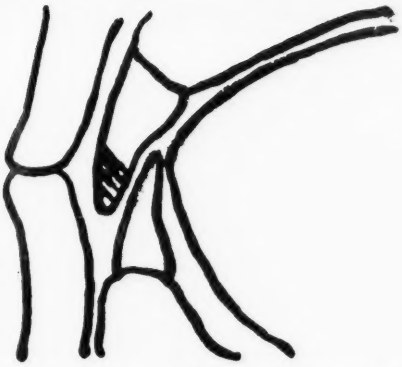


FIGURE 2. Diagram showing incisors in balanced position between the labial and lingual muscle mass. If the incisal third of the upper incisor (striated) is lost, the restraining action of the lower lip is lost. The lingual forces are then unopposed and the tooth drifts labially.

it is shown that fractured incisors do in fact tend to migrate labially, then steps should be taken to prevent this by restoring the tooth to its full anatomical form immediately. If this cannot be done for endodontic reasons, a retainer of the Hawley type might be worn at night until the tooth can be restored.

SUMMARY AND CONCLUSION

An hypothesis is presented that when the incisal portion of the crown is fractured off from upper incisors, these teeth may drift labially and become protruded (Fig. 1). This may be due to the loss of the labial pressure normally exerted by the lower lip against the tooth, allowing the lingual pressure to act on the tooth unopposed. Once the contact line has been broken, the tooth may become further protruded by the mesial drifting of the adjacent teeth. Pedodontists are asked to examine this hypothesis. If it is correct, preventive measures should be instituted much earlier than is done at present, to prevent such protrusion.

69 Rothschild Blvd.
Tel-Aviv, Israel

REFERENCES

LEWIS, T. E.: Incidence of Fractured Anterior Teeth as Related to Their Protrusion, Angle Orthodontist, 29:128, April 1959.

Report of Special Committee on Finances of A.S.D.C.

There has been, during the past two years, an increasing need for more income into the treasury of the American Society of Dentistry for Children. The President has appointed this committee to study some of the reasons for this need as it exists in our organization at the present time.

It should be obvious that since every other cost in the United States has gone up during the past ten years that the cost for running an organization as large as ours would also have increased. Since the ten-cent hamburger is now thirty cents, it stands to reason that a $5.00 national dues for our organization is also out of line at the present time.

In going over the many reasons for the need of increasing dues, this committee lists the following for your perusal:

1. The Executive Secretary of A.S.D.C. has filled a position which we now realize was vitally needed for many years. He is doing an excellent job at the present time, but at each annual meeting, we find that his duties seem to increase every month. We need to expand the Executive Secretary's office, bringing in a full-time employee to help him with his job in order to service the membership properly and to satisfy the demands of the members and unit officers for increasingly more services. It is quite clear in the minds of this committee that we are eventually going to need a full-time executive secretary with at least part-time help.

2. The increased activities of some of our committees has placed a burden upon the treasury of A.S.D.C. With the expanded work of the Membership Committee, the State Units Committee, and the suggested activities of many other committees, costs have risen. The only possible way for a committee to properly carry out its duties is to be properly financed.

3. We feel that our JOURNAL is the finest publication of its kind in the world. But as the JOURNAL increases in its potential, there is also an increase in cost of printing and, with each increase in the number of pages and illustrations, this cost skyrockets.

4. Because of the overall cost of hotels, luncheons, etc. and the need to provide excellent speakers for our Annual Meeting, the cost for this program has also increased. It has become increasingly obvious to all members of annual meeting committees that without proper financing, the Annual Meeting can of course be a failure. The fact that there are only a few cities throughout the United States that can handle the Annual Meeting, makes it a burden upon certain specific state Units with which these cities are closely associated. The committee feels this it is unfair for annual meeting committees in these specific state Units to have to struggle with finances which should be handled with a little more funds from the National organization.

5. Dentistry has grown in the past few years in the field of public relations. It is obvious that our organization must enter the public relations field with programs designed to improve dentistry for children. If we hope to do a job of informing the lay people of the United States of the importance of dentistry for children, we are going to have to spend more funds for this program.

The committee feels that the aforementioned problems are reason enough to call for an increase in the National dues. We are leaving the exact amount up to our members, but we are all of a firm opinion that something must be done to increase our potential.

Respectfully submitted,
ALBERT L. ANDERSON, *Chairman*
ALFRED E. SEYLER
JAMES H. SIMMONS

Unit News

Congratulations to Kansas and Mississippi—These new State Units will receive their charters at the National meeting.

Are you all making plans???

Student membership skyrockets in Nebraska!

Next deadline date . . . OCTOBER 25. . . .

TINY KONIKOW

CANADIAN SOCIETY OF DENTISTRY FOR CHILDREN

Over 150 delegates, most of whom were accompanied by their wives, attended the 10th annual meeting of the Canadian Society of Dentistry for Children in London, Ontario on May 13. The Carousel Motel was the locale for this meeting which included Dr. Kenneth A. Easlick of Ann Arbor, as main essayist, Dr. Guy Poyton, Department of Radiology, University of Toronto, Dr. Dave Mitchell, Toronto, orthodontist, and Dr. Jos. Muhler, University of Indiana.

Following breakfast, the delegates crowded the lounge which was set up for 7 table clinics. Four of these were

Table Clinician—Tiny Konikow, Royal Oak, Mich.

Table Clinician—Richard Corpron, Ann Arbor, Mich.

Left to Right: Dr. Alex Scrutton, London, Chairman, Table Clinics; Dr. Guy Poyton, University of Toronto, Clinician; Dr. Don Anderson, Past-President, C.S.D.C.; Dr. Kenneth Easlick, Ann Arbor, Main Essayist; Dr. Peter Currie, London, Pres., C.S.D.C.

Mrs. David Way, London, has the steady hand with, from the left, Mrs. Peter Currie, London, Mrs. Don Anderson, Toronto and Mrs. Wm. Burgman, Galt, Ontario looking very pleased with the service.

Table Clinician—Pierce McLean, Grosse Pointe, Mich.

provided by the Michigan Unit of ASDC with Drs. "Tiny" Konikow, Pierce McLean, Walter Niemann and Richard Corpron participating. These men did a fine job and contributed greatly to the cooperative spirit prevailing between the American and Canadian Societies. Dr. Chas. Okun of Toronto, Dr. Jim Millar, London, and Mrs. Phyllis McLay, London, completed the table clinic group.

A reception was held Friday evening for the early arrivals and a cocktail hour on Saturday evening closed the session. The Ladies' program was arranged by the Ladies Auxiliary of the London and District Dental Society and included a tour of the city with luncheon at Hook's Restaurant.

Table Clinician—Vim Miller, London, Ontario.

Southern California

Greetings from Mode R. Perry, general chairman of the 1960 Annual Convention of ASDC, who assures us that everything is being done by the Host Unit to give us a real "bang-up" time in October. If you have not made your reservations, do so at once by sending in your application to ADA, Box 5440, Chicago, Illinois.

Executive Secretary Lorraine Duncan notified us that on May 23, 1960, the following officers for Southern Cal had been elected:

President ..... Mario Fusco, Los Angeles
President-Elect ..... John R. Kennedy, Reseda
Vice-President ..... John L. Rhatigan, Arcadia
Sec.-Treas. . Richard W. Hallberg, Los Angeles

Northern California

From new reporter Bernie Dietz:

Although the year 1960 is half over, it gives me pleasure to introduce to you our officers for this year.

President ..... Francis Bushnell
President-elect ..... Lynn M. Rudee
Vice-President ..... Claude P. Warden
Secretary-Treasurer ..... Lee Winters

The California unit is happy to announce that the 5th Annual Pedodontic Seminar will be held at Squaw Valley Lodge in the high Sierras.

The dates: September 15-18, 1960.

The program will be presented by:

John Tocchini—General Anesthesia and Operative Dentistry
Donald Zimmerman—Practical Pharmacology
I. I. Beechen, Charles Sweet, Jr., Barry Rudine } Interceptive Orthodontics

Our President is anxious to show that we are interested in all the members of

ASDC of the California Unit. Members of areas several hours away from the Bay Area do not get to attend many meetings —so the Bay Area members are going to them. We are looking forward to such a meeting that will be hosted by Sacramento. The meeting will be in November.

Many of our members will be at the national meeting in October. We'll look for you and let you share your triumphs with us.

Florida

C. O. Shows of the Florida Unit announces that they are sponsoring a Postgraduate Seminar on "Practice Administration and Case Presentation" by Dr. Francis W. Summers, on December 2-4, 1960 at the Royal Caribbean Hotel, Montego Bay, Jamaica. Registration fee for ASDC members is $25.00. For further information write to Dr. Neil G. Powell, 1202 Kuhl Ave., Orlando, Fla.

The newly elected officers of the Florida Unit are:

President	Gerald Halker
Vice-President	Charles Fain
Secretary-Treasurer	Neil Powell

Members of ASDC who may wish to vacation—and learn—in Florida in January 1961, should read with interest the full page announcement of the Florida Unit's 1st Annual Pedodontic Seminar, appearing in this issue of our Journal.

Georgia

From Georgia comes this news from Bill Shupert:

The annual postgraduate seminar will be held at the heart of Atlanta Motel, in Atlanta, Ga. on Sept. 18-19.

The principal speaker will be Ralph McDonald, chairman of the Dept. of Pedodontics, University of Indiana.

Football tickets for the Georgia Tech-Kentucky football game on Saturday, Sept. 17 will be available to those attending the seminar.

Request information or reservations from: Dr. Wm. R. Shupert, 1293 Peachtree St. N. E., Atlanta 9, Ga.

Hawaii

From the Aloha state via Unit Secretary Yokoyama comes this news. Three outstanding pedodontists will be arriving in Honolulu within the next four months to present lectures and a postgraduate course.

On August 2, 1960, Dr. Louis DeMeo of Oakland, California will be the guest speaker at the quarterly meeting of the Hawaii Unit. His topic will be "Modifications in Pedodontics—Equipment and Instruments."

Dr. Charles A. Sweet, Sr., supervisor of Dental Health Education of the Oakland Public schools and visiting professor of Pedodontics at the College of Physicians and Surgeons, will present a five day postgraduate course on dentistry for children at the University of Hawaii Dental Clinic from August 6 through 10, 1960. The course will include illustrated lectures on child management, treatment planning, exposed pulps of primary teeth, radiography and diagnosis, non-vital primary teeth, cavity preparation and filling primary teeth.

The third pedodontist also from California is Dr. Francis W. Summers of La Canada who will present a paper on "Children's Dentistry" at the Pan-Pacific Dental Conference to be held in Honolulu on August 23-27.

Kansas

To the new Unit of Kansas, we say "Welcome to the ranks of ASDC."

Their organizational meeting was held

Joseph F. Burhet, Sec'y.-Treas., left, and A. Wayne Rose, Pres. receiving letter of recognition for the Kansas Unit.

in Wichita recently and the following officers were elected:

President ..... A. Wayne Rose
Secretary-Treasurer ..... Joseph F. Burhet

Louisiana

With Victor Marquer of New Orleans and President-elect James Simmons, the members-at-large of Louisiana petitioned the American Society for Dentistry for Children for a state charter, April 29, 1960.

Reporter Sansovich states that their charter was approved July 18, 1960 and they now have 68 members and the following officers:

President ..... Edward J. Hannie
President-elect ..... Frank L. Herbert, Jr.
Vice President ..... N. T. Asprodites
Secretary-Treasurer ..... Lucas C. Sansovich

The Louisiana Unit and the Loyola Dental Alumni committee will co-sponsor a two day postgraduate course on Dec. 10-11 at Loyola University, on Interceptive Orthodontics by Dr. Sidney I. Kohn, professor of Pedodontics at the Fairleigh Dickinson University School of Dentistry at Teaneck, New Jersey. Cost of the two day course is $50.00 per person. Send applications to Loyola School of Dentistry at New Orleans.

Congratulations to our newest Unit.

MARYLAND

From H. B. McCauley, new reporter of the Maryland Unit comes this news. The weather in Atlantic City was either too good or too bad to permit more than a token attendance at the luncheon which was to be the occasion of the 1960 annual meeting of the Maryland Society of Dentistry for Children on Saturday, June 11. It was therefore necessary to conduct the business of this meeting on July 14 in the customary surroundings of the Marylander in Baltimore.

It was reported at the meeting that the membership was near 200 and included 29 dental students and 13 dental assistants. There were no dental hygienists. For the second time, the Unit recognized superior accomplishment in Dentistry for Children by making an award to a senior dental student in the University of Maryland. In 1959, the award plaque went to Francis Simansky who is now practicing in Bel Air. Charles Albert Darby was the winner of this year's award.

The officers for the year 1960-1961 are:

President ..... William Schunick
President-Elect ..... Allie Skib
Vice-President ..... John H. Sharpley
Secretary-Treasurer ... Benjamin S. Crosby, Jr.

The program in the current year will include continuation of the quarterly dinner meetings at the Marylander. It is also planned to further public education by again joining the State Dental Association to present an exhibit at the Annual meeting of the Maryland State Teachers Ass'n in October, and to promote in every way possible "the advancement and dissemination of knowledge of all phases of Dentistry for Children" to the profession and the public.

Massachusetts Unit Annual Meeting—From left to right: Robert I. Diamond, president; Roy L. Lindahl, guest speaker; Louis J. P. Calisti, retiring president and Charles Boyers, past president.

Massachusetts

At the annual meeting of the Massachusetts Unit, Dr. Roy L. Lindahl, professor of pedodontics at the University of North Carolina Dental School, was the guest speaker. He gave an informative talk on the curriculum followed in the pedodontic course at the University.

The results of the annual election of officers are as follows:

President	Robert I. Diamond, Boston
V.-Pres.	M. H. Gulbrandsen, Wellesley Hills
Secretary	Carl G. Cohen, Belmont Center
Treasurer	Alvin A. Krakow, Brookline

Michigan

The Michigan Society of Dentistry will co-sponsor a meeting with the Oakland County Dental Society on Tuesday, October 11, 1960 at the Kingsley Inn, Bloomfield Hills, Michigan. The Orthodontic Study Group of London, Ontario will present a program for the membership. More about this later.

Robert McNab Kerr, Chairman of the Board of the Kerr Manufacturing Company of Detroit, Michigan, died at his home in Detroit on July 27, 1960, at the age of 90, after a brief illness. He had been associated with the Kerr Company since he and his brother founded it as the Detroit Dental Manufacturing Company in 1891. Through most of that time he had been the company President, until succeeded in that position by his son, Robert M. Kerr, Jr., in 1945.

Born on a farm near Tilbury, Ontario, of Scotch-Canadian pioneer stock, Mr. Kerr was the youngest son in a family of six boys and two girls. He spent his boyhood in Ontario. Following the early death of his father, and after completing his high school education in Canada, he moved with his family to Detroit where they became United States citizens and where he lived since that time.

From a one-room operation in 1891, the Kerr Manufacturing Company in the past 69 years has grown to be the largest manufacturer of its type in the world. It has an enviable reputation for quality products, progressive leadership, and cooperation with organized dentistry in research and improvement of dental materials.

For his personal contribution to dentistry, Mr. Kerr was honored with a citation from the Michigan State Dental Association at its 100th Anniversary in 1956.

The members of the Michigan Unit express their sympathy to the survivors of Mr. Kerr, who for many years has been a staunch advocate of good dentistry for children and supporter of our activities.

Minnesota

Bob Boller sent this fine report as his "finale" . . . Ned Brown is the new reporter. The Annual Social meeting was held on May 17, 1960 at the Calhoun Beach Hotel. Over ninety persons attended. After a short business meeting, the following officers were elected:

President	Ray Petersen
Vice-President	E. L. Brown
Secretary	Jerry Ulrich
Treasurer	Don Hurwitz

At this meeting, the membership had the pleasure of seeing Bill Jordan's and John Snyder's new 16 mm. color and sound movie entitled, "Alice's First Visit to the Dentist." This movie presents 17 minutes of excellent material, beautiful photography and wonderful narration emphasizing the child's visit to the dentist at an *early* age. The meeting wound up with an informative and up-to-the-minute talk by the well-known news analyst, George Grim.

The 11th Annual all-day meeting will be held at the Mayo Memorial Audito-

They are (back row, left to right): Past-president, Rudy Delton; treasurer, Don Hurwitz; immediate past-president, Walt Iverson; secretary, Jerry Ulrich; past-president, Bob Boller; past-president, Manfred Jacobson; past-president Irv Posnick; (front row) vice-president, Ned Brown; and president, Ray Petersen.

rium on the University Campus Sept. 22, 1960. "Interceptive Orthodontics" will be discussed by Dr. Earl Shepherd of St. Louis and Dr. Harry Sicher of Chicago will speak on "How the Primary Teeth Erupt."

It appears that our "Golden Gophers" are starting the "soaring sixties" with typical enthusiasm.

Mississippi

A hearty welcome to our newest Unit! Bruce Eddy, Unit Secretary, writes that on January 29, 1960 a meeting was held for the purpose of organizing the Mississippi Unit. Dr. Thos. C. Pyron of the pedodontic department of the University of Tennessee was guest speaker and presented an interesting paper on "Full Coverage Restorations."

During the State Dental convention another meeting was held to work out further details in the organization of the Unit. Both meetings were well attended. The request for a charter as a constituent Unit of ASDC was unanimously approved by the Executive Council and the charter will be presented at the annual meeting in Los Angeles.

Officers elected to serve for the year are:

President	Chas. G. Blue
Vice-President	Plummer H. Wynn
Secretary-Treasurer	Bruce Eddy

Montana

The Montana and Idaho Units held a very fine joint meeting in Yellowstone Park in June with Dr. Bernard Rabinowitch as guest clinician. The Montana Unit set a record for attendance, having 39 members at the meeting.

The following officers were elected:

President	P. M. Feda, Wolf Point

Vice-President ... Wayne Thompson, Bozeman
Sec.-Treas. ..... Fred R. Schwin, Red Lodge

Dr. P. M. Feda and Dr. Burley Packwood are delegates to the ASDC convention in Los Angeles.

Nebraska

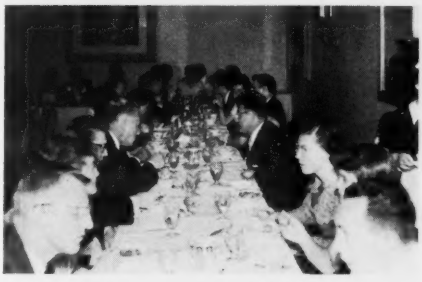
All Units should take special notice of Nebraska's accomplishment. We heard that the Nebraska Unit recently had a drive for student members and increased their membership by 64. The Unit subsidized one half of each of the membership fees—a very worthwhile project. Nice going, Nebraska!

Don Stormberg states that the Unit is planning a Clinic-Lecture meeting in October with members of Beatrice as hosts. Table clinics and lectures are being arranged, also, a Sunday evening get-together and dinner.

New Jersey

"Shorty" Gale states the Garden State Unit had a most successful meeting in conjunction with the New Jersey State Dental Society. The guest speaker was Dr. Harry Bakwin, prominent pediatrician of New York City who gave a most interesting and informative talk on "Child Behavior and the Dentist." A question and answer period followed.

Mel Bellet of Palisades Park, chairman of the Professional Education Committee has made arrangements for the Annual Seminar to be held on Wednesday, Nov. 2, 1960 at the Fairleigh Dickinson University. Lecturer, Dr. Ralph E McDonald, University of Indiana, will include in his subjects: Preventive Orthodontic Procedures; Examination and Treatment Planning for the Child Patient; and Dental Caries. The seminar will be held from 9:00 a.m. to 5:00 p.m. Fee, including lunch is $25 and enrollment is limited.



Members at large at President's Banquet.

New Mexico

"Not a great deal of news this time," says I. L. Voda from down Mexico way. The New Mexico Unit held a luncheon meeting during the Annual convention of the New Mexico Dental Association on May 16, 1960. Members present numbered twenty-two with sixteen guests at the meeting. Six new members have been added this year.

The next meeting will be held on August 10 and will be an afternoon session on "Root Canal Therapy," followed by a dinner business meeting.

Dr. H. Curtis Hester, Glenn Ridge, N. J., President of the New Jersey Society of Dentistry for Children, presenting an honorary membership to New York Pediatrician Dr. Harry Bakwin.

New York

Nice to hear from the Metropolitan section of the New York Unit through Stanley A. Hoch.

On Thursday, May 5, 1960, the Metropolitan section had its final meeting. The main clinician was Dr. Irving Skolnick who spoke on "Normality of Spacing in the Human Dentition." Table clinicians were: Dr. Martin Feingold, Dr. Walter Schwartz, Dr. Ovid Slavin and Dr. Jerome Sorrel.

New officers for the year are:

President	Joseph Keller
President-Elect	Mark Wallach
Vice-President	Albert Green
Secretary	Stanley A. Hoch
Treasurer	Gerhard Schmelz

Ohio

Wm. J. Davenport of the Stark County section of the Ohio Unit reports it held its quarterly meeting on June 7, 1960 at the Onesto Hotel in Canton.

Dr. Wm. Maddox, faculty member of the Ohio State University College of Dentistry, Department of Pedodontics, who was guest speaker, discussed "Pulp Management." His presentation was well received.

This section plans to assign a research project to members and after their findings, hold discussions.

Oklahoma

T. J. Guthrie sends this brief bit of news: The Unit met for a business meeting during the Oklahoma State Dental

meeting in April. The following officers were elected:

President ..... George Coe, Tulsa
President-Elect ..... William Rose, Chickasha
Secretary-Treasurer ..... Jim Torsia, Tulsa

Tentative plans are being made to arrange for a clinician to speak to the group in January 1961.

Pennsylvania

Nice to hear from Ben Grossman with this bit of news of his Unit: The Pennsylvania Unit held a highly successful meeting with the State Dental Association on June 10, 11 and 12 at Bedford Springs, Pa.

Dr. Wm. Brown, national president of ASDC, was the principal speaker and gave a very fine presentation on "Treatment of Malocclusions by the General Practitioner."

Of great interest was the newest effort of the Unit in sponsoring essay contests in the field of Pedodontics for seniors in the three dental schools. The three winning essayists were treated to a free weekend at the Convention. The winners and their essays were as follows:

Dr. Bernard Cohen, University of Pittsburgh, on "Application of Hypnosis to Pedodontics"; Dr. Dale Schaeffer, Temple University, on "Treatment of Thumbsucking Habits"; Dr. Jerald Miller, University of Pennsylvania, whose subject was "Study of Habits and Oral Conditions of Mentally Retarded Patients."

Officers for the year are as follows:

President ..... Bob Spangler, York
President-Elect ... Ben Grossman, Philadelphia
Sec.-Treas. ..... Howard Tucker, Pittsburgh

Rhode Island

A little news from the littlest State! Dick Whelan reports that the following were elected as officers at the May meeting:

President .. Herbert J. Underhill, E. Greenwich

Dr. Bill Brown comfortably lecturing.

Bob Spangler, newly elected President handing over President's Plaque to retiring President Mort Winkler.

Three Senior Winning Essayists—Bernard Cohen, Dale Schaeffer, Jerald Miller.

Vice-President .. Richard J. Whelan, Cranston
Sec.-Treas. .... Stuart A. Manchester, Cranston

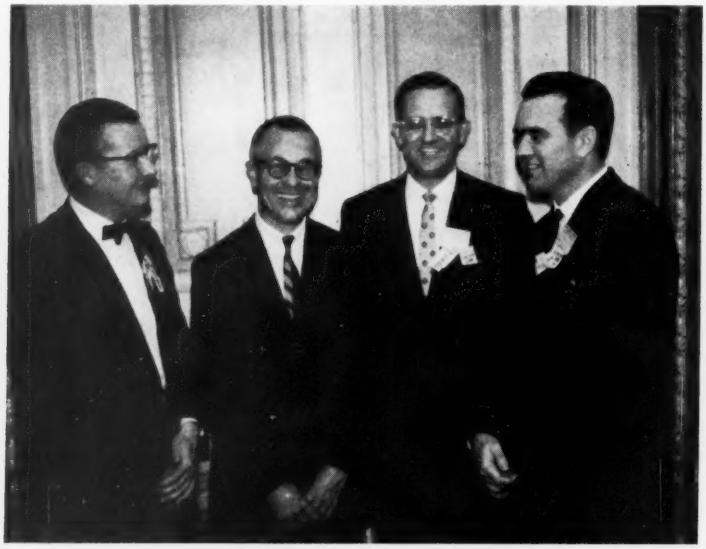
Tennessee

Good to hear from Tennessee through Joe Fuson. Doctor Ralph Ireland, dean of the University of Nebraska was the featured clinician at the State Dental Convention in Memphis. It was the consensus of all who attended that his lectures on Dentistry for Children were in-

formative and very interesting. Through the excellent guidance and leadership of President Bob Taylor, the Tennessee Unit has had an outstanding year, an increase in membership and many fine programs.

Officers for the year are:

President	Earl Crumpton, Knoxville
President-Elect	Carl Holmes, Chattanooga
Vice-President	Harold Burns, Knoxville
Secretary-Treasurer	Scott Dunford, Knoxville



Left to right: Earl Crumpton, president-elect; Ralph Ireland, clinician; Jim McKnight, secretary-treasurer; Bob Taylor, president.

Virginia

Here is what Charley Vincent writes of his Unit: The big news from Virginia is the announcement of the 1960 Pedodontic Workshop which is sponsored by the Medical College of Virginia and co-sponsored by the Virginia Unit. Place is Natural Bridge, Virginia, in the Shenandoah Valley on Thursday, Friday and Saturday, November 3, 4 and 5. The all-

Material intended for Unit News should be sent to Tiny Konikow, 500 S. Washington Ave., Royal Oak, Michigan. Deadline dates: First Quarter, January 25; Second Quarter, April 25; Third Quarter, July 25; Fourth Quarter, October 25.

inclusive rate of $52 single and $48 double includes registration fee, tuition, two nights lodging and meals beginning with dinner on Thursday night through Saturday lunch. A special rate for husband and wife for the meeting is $71.00. Speakers will include Dr. Henry M. Wilbur, professor, department of pedodontics, University of Louisville; Dr. Wm. S. Kramer, professor, department of Pedodontics, University of Nebraska; Dr. Robt. A. Senescue, professor, department of psychiatry, Medical College of Virginia. Subjects to be discussed include chrome crown restorations, local anesthesia complexities, anomalies and variations of dentition, problems of space maintenance, interceptive orthodontics and emotional factors in child management. In addition, there will be table clinics, movies of special interest and question and answer periods.

Registration is not limited to dentists in the Virginia area. You are all invited to attend. Just send your name, address and check to: Dr. Max D. Largent, Medical College of Virginia, School of Dentistry, 521 N. 11th St., Richmond, Va. Hotel reservations will be made for you. Table clinics are invited and should you wish to present one, include the title in your letter.

Washington

David B. Mooers sends this interesting news: The Washington Unit sponsored a very instructive session on May 5, 1960 for the graduating seniors of the University of Washington Dental School.

The session, organized by Past President Robert Blancher, was composed of a series of table clinics as follows:

Immediate Space Maintainers Using Rocky Mountain Products .... Dr. Robert Blancher
Appliances for Crossbite Correction and Space Regaining ..... Dr. Dave Mooers and Dr. Richard Nelson
State Health Dept. Aids to the Pedodontic Practice ..... Dr. Olin Hoffman
Orthodontic Considerations in the Pedodontic Practice ..... Dr. Les Erickson
Pulp Therapy in Primary Teeth ..... Dr. Neil Beasley
Child Management and Premedication ..... Dr. H. Rosenbaum
X-Rays for Children ..... Dr. Morris Bay
Handling Pedodontic Emergencies in the Office ..... Dr. Walter Smith

A question and answer panel discussion relating to office procedures in a practice for children was also a part of the session.

The seniors were apprised of the advantages of membership in the ASDC and cordially invited to join upon graduation.

Neil Beasley, left, and Claude Warden of California, guest clinician.

The Spring-Summer meeting was held at Yakima on June 13 with Dr. Claude Warden of Walnut Creek, California as lecturer. It was a most interesting and instructive presentation on pressure proc-

essing of cold cure acrylics, designs and construction of corrective oral appliances and slide studies of many interesting case histories.

The Unit is looking forward to the Pacific Northwest Conference of the ASDC to be held at Shore Lodge at McCall, Idaho, on August 29, 30 and 31, 1960.

Dr. Robert Moyers, author of "Handbook of Orthodontics" will discuss the Etiology of Malocclusion, Planning the Treatment, of Clinical Problems and the Administration of Orthodontic Problems in General Practice.

Many social events are being planned in connection with Dr. Moyers' clinical presentations. This promises to be one of the outstanding meetings of the year.

The Washington Unit is proud of and congratulates one of its members, Dr. Herbert W. Fleege, on his recent election as president-elect of the Seattle Dental Society. Dr. Fleege was one of the founders of the Washington Unit and is a member of the Academy of Pedodontics and the American Academy of Dental Practice Administration.

Wisconsin

The Annual Spring meeting of the Wisconsin Unit was held at the Holiday House in Milwaukee on Sunday, May 8, 1960. Eighty-nine members attended. Dr. Galen W. Quinn, head of the Department of Orthodontics, Duke University Medical Center, Durham, North Carolina, was guest clinician. His topics were: "Diagnosis of Existing Occlusion" and "Orthodontics for the General Practitioner."

The following officers were installed:

President	James Helz
President-Elect	Earl Fetting
Vice-President	James Malone
Secretary-Treasurer	Gerald O'Marro

An evening banquet, dancing and entertainment followed the afternoon session.

Plans are progressing for the Fall meeting which will be held in the New Motel at Appleton on September 26, 1960.

* * *

Announcement

A meeting of the Association of American Women Dentists will be held at the Biltmore Hotel, 515 S. Olive, Los Angeles, California on Monday, October 17, 1960. Breakfast and a business meeting is called for 9:00 a.m. A hospitality room will be maintained at the Biltmore to which visiting women dentists will be welcomed. On Monday, October 17, 1960, a banquet will be held in the Venetian room of Ciro's, 8433 Sunset Blvd., Hollywood. For further information, write Dr. Edith C. Straus, 435 N. Bedford Dr., Beverly Hills, California.

* * *

Course Announcement

Title: Dentistry for Handicapped Children
Place: University of Pennsylvania, School of Dentistry
Date: December 12, 13, 14, 1960
Speaker: Dr. Manuel M. Album and Associates

This course has been arranged to give the practitioner a better understanding of the dental problems and treatment of children who suffer from cerebral palsy, mental retardation, muscular dystrophy, multiple sclerosis and other handicapping conditions.

For further information, write to Postgraduate Office, School of Dentistry, University of Pennsylvania, 4001 Spruce St., Philadelphia 4, Pa.

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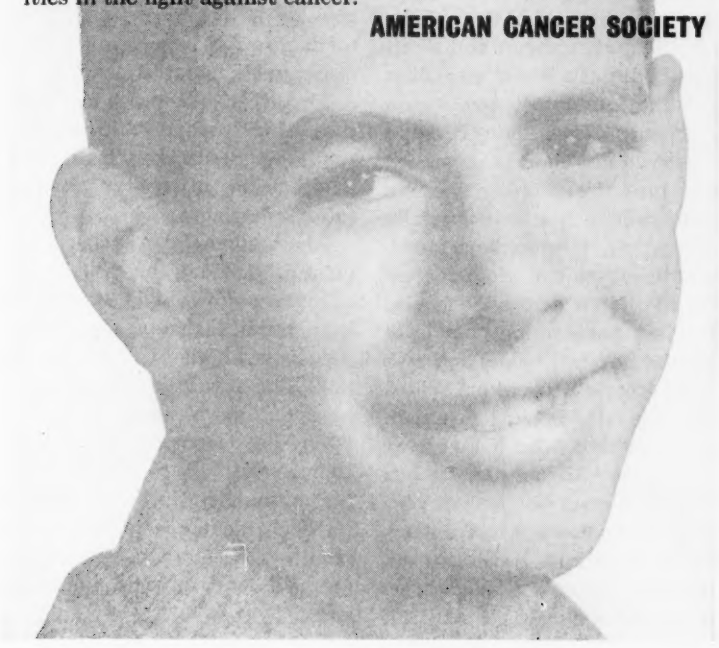

Speech Disorders in Children*

H. Koepp-Baker, M.S., Ph.D.

YOUR ability to talk is the most human thing about you. Communication by means of abstract acoustic and visual signals is the most distinguishing feature of man. It is the most recent of his important biosocial acquisitions. The use of this symbolic code makes demands which exceed all other functions in complexity, exactitude, and psychophysiological nicety.

The state and the quality of his speech are sensitive reflectors of the integrity and responsivity of all of man's body systems. It follows that anything which affects his speech inappropriately affects the most human part of him. Conversely, that which affects the systems and structures of his body may be advertised in his speech behavior.

It is useful to make a few additional general observations about the speech function in man. First, unlike locomotion or eating, it is not a biologically inherited function. It must be learned. Speech is not the result of biologic maturation. It is a learned social behavior pattern. It does not develop outside of a social climate. A child does not talk because his biologic progenitors talked before him. He talks because others in his environment talk now. To be sure he must bring to this learning task a psychosocial readiness. But he talks because his environment is a talking environment. In short, he learns to talk by imitating the talkers in his environment and by continuously refining this skill of vocal imitation.

He must possess certain prerequisites for successful imitation. Important among these prerequisites are intact and functioning audio-visual, tacto-kinesthetic, and sensory systems. Speech must first go through the ear and eye before it can come out of the mouth. The child born with a profound hearing loss does not learn to talk without the most laborious assistance. Children with a serious deficit in visual acuity are also markedly delayed in learning to talk.

Critical too, is the intactitude of the *central* nervous system. By it the audio-signals received by the ear from the environment, are conducted, integrated, translated, and expressed through the mechanisms of speech production in the respirato-alimentary tract.

The *peripheral* speech mechanisms are those directly responsible for the production of the speech signals. These are modifications of the functions of respiration, chewing, sucking and swallowing.

It is most useful to view the development of speech in the child in the frame of his *total* growth and development. We have implied that a certain readiness-state is required for a normal child to talk. The acquisition of his speech will be retarded or accelerated depending upon the degree of maturation which characterizes all of the dimensions of his personality. He must come into a physical, mental, emotional, and social readiness. These then may be described as the "developmental imperatives" of speech.

Fifteen years ago in his developmental theory Gesell pointed up the differential maturation of the sensorimotor modalities and their effect upon personality development. There is an orderly pro-

* Presented before the American Academy of Pedodontics, Sept. 11, 1959, in New York City.

gression of physiological and psychological events following a prescribed space-time order, that normally culminate in the acquisition of speech. Delay in attaining speech connotates a disruption in the normal progression of these events. The speechless child is not *ready* to speak. He does not yet have, or has not yet mastered, the prerequisites—the "developmental imperatives."

The sensorimotor mechanisms come into a state of speech readiness somewhat earlier than do the psychosocial mechanisms. Maturation of the processes of intellection, of emotionality, and sociality must proceed to a point at which the content of language can be received, produced, or manipulated. The mental processes must have ripened to a level in which judgment, insight, choice, and problem-solving are beginning to characterize the child's behavior. Emotional development must have reached a point at which speech and language transcend the simple primitive vocalizations of fear and anger. The child must move from his state of complete ego-centricity to awareness of dependency upon others-than-self whose behavior he needs to control to his advantage.

Speech is a product of the whole person. Its normal production requires a highly exact integration and control of the great organ systems of the body. Let us enumerate these: (1) the central and parasympathetic nervous systems; (2) the endocrine system as a mediator of behavior; (3) the muscular systems; (4) the skeletal systems; (5) the respiratory and alimentary systems. Speech is a code of both acoustic and visual signals. The audio code consists of sounds. These are noises and tones which result from specialized postures and movements of the structures making up the respirato-alimentary canal. Respiration is modified so that there is a controlled flow of air from the lungs through the trachea, pharynx, and the mouth. This air flow is characterized by pressure pulses. These pressure pulses are the building blocks of speech. They are known as the physiologic syllables. The letters of the written alphabet or their names must not be confused with these physiologic or syllable pulses. The letters of the alphabet and their names are part of the *visual written* language.

Speech is audible—it is sound. The pneumatic pulse is the physiologic basis of speech sounds which are heard. The speech sounds are the result of specific ways in which these pulses are manipulated. The lumen and shape of the respiratory canal through which these pneumatic pulses pass are modified by the muscle groups surrounding the tube. The tube may be completely closed or completely open, or it may have many degrees of occlusion or closure between these two extremes. The first point of modification of this syllable pulse is at the specialized area of the tracheo-bronchial tree called the larynx. This structure is a vegetative valve. It closes the air canal or only reduces its size. In doing so there is produced at the level of constriction, a sound—a periodic acoustic vibration—producing periodic pressure changes which are recognized as a musical tone. This speech tone is amplified and given its characteristic quality by the resonating spaces above it. These spaces are the pharynx, the mouth, and the nose.

At still higher levels in pharyngeal and oral parts of the canal there are further reductions in the lumen of the tube which again range from complete closure to the widest opening. As the pulmonary air is valved by varying degrees of constriction of the throat and

mouth, aperiodic sounds called speech noises are produced. These noises result from air turbulencies produced at the neck or opening of the points of constriction of the tube. As speech proceeds then, there are emitted from the mouth both tones (the vowels) and noises (some of the consonants), or the tones and noises may be combined and result in still other consonants.

Let this be translated into your introspective experience. If you say "oh," the breath is being valved at the laryngeal level, and the sound you hear is an acoustic vibration arising in the larynx. Above the vocal folds this acoustic signal is given its "oh" quality or characteristics by the shape and size of the pharyngeal and oral resonators. Experiment a moment. Hold the vowel tone of "oh" and as you do so, increase the size of your oral resonator by depressing your mandible and lowering your tongue. What you now hear is "ah." If you were to put the tube of a stethoscope through your mouth and pharynx down to a point a little above your vocal chords, you would be unable to discern any difference between the tone of "oh" and the "ah" at that point. It becomes "oh" or "ah" by the shaping of the pharyngeal and oral acoustic resonators.

There are in English speech about sixteen such tones, the quality or identity of which is determined by the shape and size of the pharyngeal and oral acoustic resonators. For these tones the resonators must be stable and fixed. If these vocal tones or vowels are produced with a movement or change of shape of the resonators, a blend of vowels is produced. This blend is called a diphthong. The word "high" or the word "dew" will show the effect of instability and movement upon a vowel identity.

Now let us turn to the *noises* which are the aperiodic sounds of speech. They are primarily the result of certain pneumatic phenomena. If the pneumatic pulse is discharged through a small neck of a constriction in the mouth, a special kind of speech sound may be produced. This may be illustrated by placing the lower lip against the incisal margin of the upper central teeth. The passage of air through this restricted space will produce the noise which will be recognized as the first sound that is heard in the word "first." This sound is the product of the particular kind of air turbulency just outside the teeth and lower lip. If the constriction is produced farther back in the mouth, by the sides of the tongue and hard palate, and leaving a small aperture between the tip of the tongue and the anterior third of hard palate, the resulting pneumatic turbulence thus produced is recognized as the third sound represented by the written "s" in the same word "first." However, if the respiratory tube is completely closed at the same point, producing a differential pressure between the inside of the oral cavity and the outside, and this pressure is suddenly released in an explosive discharge, a brief but energetic turbulency will result and be recognized as the last sound of the word "first"—the sound *written* as the letter "t."

There are several critical attributes of speech which are so determinative that they may be used as guides in estimating the effectiveness of the speech function. The first of these is the attribute of intelligibility or simply " its understandability." Unless speech can be understood, that is, is intelligible to the listener, it is not in our sense, speech. The audible signals produced by the speaker must

have such acoustical clarity and distinctness that the appropriate listener-reaction is assured. As the listener attends to speech he must be able to recognize the individual speech sounds and their combinations in words, phrases, and sentences.

Another attribute of effective speech is its freedom from distracting elements. In an engineering sense this would be freedom from noise in the audio circuit. When speech is accompanied by nonphonetic or non-communicating sounds, communication suffers damaging interference.

The speech of the child with cleft palate or cerebral palsy illustrates this feature of disordered or defective speech. As these children attempt to produce speech, the vocal signals which they produce are accompanied by non-communicating audio signals which do not carry the sense or meaning but instead, call attention to themselves and are therefore competitive, distracting, and confusing. At other times these alien audio signals may communicate a wholly different meaning—one of unpleasantness. But the cleft palate or cerebral palsied child has further problems. His serious anatomic and physiologic limitations will prevent him from making accurately the requisite muscular movements in the mouth and throat. But the distorted movements, or the absent movements, will produce atypical acoustic signals and these will be nonphonetic, without meaning—and competitive to the correctly produced sounds. The speech may simply be unintelligible. Further, because of the same or other anatomic and physiologic limits, the child with bulbar polio or cleft palate will not be able to use the acoustic resonating spaces in a normal way. All of his speech will have a quality which is best described as being hypernasal and which is very distracting and often disagreeable.

In the stutterer or in the paretic still another important attribute of speech is disturbed. This is the attribute of rhythm. The forward moving cadence —the progression of the muscular and acoustic events will be interrupted, accelerated, or deaccelerated. This interferes with intelligibility and is distracting. In the child whose cerebral palsy affects his speech three features are present. His paralysis makes accurate movements of the speech organs exceedingly difficult. This affects the intelligibility of his speech signals. His generalized efforts to control all body movement will produce both audible and visual distraction. His motor rhythms are seriously disturbed.

We may now examine in greater detail representative speech disorders whose etiology is somatogenic as distinguished from those that are functional or psychogenic.

Among the very grave speech disabilities are those associated with congenital or acquired disturbances of the central nervous system. These children are commonly called "the brain-injured." Trauma of the brain in passage through birth canal, hypoxia and anoxia, Rh incompatibility, and similar assaults on the integrative and conductive areas of the central nervous system may be reflected in disturbed language and speech. These disturbances will range from arrested language and speech development expressed in late or non-acquisition of speech, to neuro-motor inadequacies involving either or both the skeleto-motor or visceral systems.

In the cerebral palsied child we find

an altered neuro-motor control in which the muscles of speech share. Hence, speech is very commonly disordered in the cerebral palsied child. In the event of damage to the central neuro-motor control areas by other types of disease processes, for example in the viritic infection of poliomyelitis, speech symptoms may be very specific. In bulbar polio a critical speech valve at the palato-pharyngeal level may be paralyzed with profound hypernasality characterizing the speech.

On the other hand the child born with cleft palate and cleft lip has a speech disorder produced by congenital malformation of the peripheral, rather than the central speech organ systems. The neural service to the speech organs of these children is usually unaffected but a number of the organs of the respirato-alimentary canal are anatomically inadequate or functionally disorganized.

The speech symptoms of the child with brain damage and the child with the teratism of cleft palate will range from complete absence of speech through disturbed intelligibility and dysrhythmia, and associated distractive acoustic concomitants.

There is another large classification of speech disabilities which as far as we now know is *without* demonstrable somatic or organic cause. These we term functional speech disorders. Their etiology appears to lie in the areas of learning and conditioning. They represent the largest number of speech handicapped in the school population. Their speech is distinguished by disturbances of intelligibility and rhythm. They are the children with articulatory problems or stutterers. The use of the term "articulatory" may confuse the dentist. The process of articulation in speech represents the myokinetic activities by which the speech sounds are made in the mouth. It is a term for the oral movements which produce the units of speech.

For reasons some of which are understood and others not yet known, many children find it difficult or impossible to produce accurately or clearly one or more of the speech sounds even though the speech organs are normal. The sounds may be absent or distorted, the acoustic signal ineffective. This speech defect appears to be a result of some subtle inadequacy in speech learning. To understand this and other speech disorders—both the somatic and the nonsomatic—we must examine the intimate relationship between the sense of audition and that of speech. Actually, hearing and speech are two faces of the same coin.

In man, hearing subserves principally the function of speech, and speech is not possible without hearing. The auditory mechanism is the monitor of speech. It regulates and controls the speech output. In engineering terms it is a servo-control system. The audio-oral circuit may have interference in the receiving, the switching, or the sending elements. The disturbance of audition may reside anywhere in the circuit which includes the ear, the eighth nerve, or in the auditory center in the brain.

From the earliest moments of speech learning the child depends upon his ears to receive the audio-signals of his speaking environment. Equally important is the service his own auditory mechanism provides in receiving and refining his own speech. He must hear himself in order to make the transition from the random production of vocal sounds as an infant to the production

of purposive speech. Thus he passes through the learning stage of self-imitation.

To return now to further consideration of the non-organic or functional type of speech disorder: Many of these children lack refinements in the auditory discrimination of the sounds of speech. This may be in a fault of the ear but more commonly it is a central neural idiosyncrasy. The child whose mental, emotional, social maturation has been delayed will present the symptoms of infantilism of speech. This is known by the more tender term of "baby talk." Often, however, though this is assumed to be unimportant, it may in some children be the key to evidences that the child's emotional and social development has been either iregular or consistently retarded.

One of the very puzzling disorders of speech is the one that we have identified as stuttering. The principle symptoms are those of a serious dysrhythmia which is expressed in blocks and repetitions of the syllables of speech. Accompanying these physical symptoms are profound anxiety reactions which, if the disorder continues, are learned and become a part of the disorder-complex. These anxiety reactions produce further speech dysrhythmia and the disturbance is self perpetuating.

Our present clinical knowledges about stuttering suggest that: (1) repetitions of speech are common in all normal children during the period in which speech is being learned and stabilized. (2) For reasons not clear, anxiety states become associated with these normal speech repetitions in some children. (3) The treatment must be directed toward the alleviation of the unhealthy emotional reactions which attend the speech act.

Now it may appear that I have been unnecessarily technical in this discussion of speech disorders. But I hasten to point out that the concepts I have developed are by no means as academic as they may have sounded. Circumstances of my life have dictated that in the course of my professional service as a speech pathologist and as a speech clinician I have been able to study and to treat several thousand speech disordered children. I know that the disorders from which they suffer are more complex and more puzzling than many in the pediatric area, and often more difficult to treat successfully. It is for this reason and because of this experience that I have discussed their pathology in a serious and a scientifically mature manner. I know of no field in which so much nonsense is believed and so much superficial treatment is prescribed!

I should like now to deal with some of these fallacious conceptions and practices. The scientific and clinical insights which we have gained by our earlier exploration of the nature of speech disorders, will help us now to recognize the inadequacy of most ideas held by medical and dental specialists regarding them.

It is generally assumed that speech disorders are disorders of the mouth. In a superficial sense this may at times be true. In a more exact sense, however, speech disorders are malfunctions of adjacent or remote areas or organ systems. If the child's mouth is structurally deformed or suffers a destructive disease or trauma, it is quite possible that his speech will also be deformed. But it is much more frequently the case that the mouth is quite within normal limits of structure and function. The disorder's cause is to be found in the central

nervous system or in regions of the speech mechanism other than the oral cavity. A second principle of importance is that speech therapy, in most instances, is a problem of learning—of re-education rather than surgical manipulation or oral orthopedic treatment. This is well illustrated by the surprise and disappointment both the parent and the specialist may express when the cleft palate child has had his palate surgically closed and the speech seems to be changed so little. Many prosthodontists may expect that placement of a prosthetic speech aid will dramatically improve speech and are distressed and embarrassed when it does not. If the orthodontist has assigned the cause of an articulatory speech disorder to malocclusion, he will usually be disappointed in the speech results when he has put his patient in a more normal dental occlusion. It is in the child with a brain injury that this principle is further illustrated. If the brain injury is limited to the motor areas of the brain, the child will probably show muscular disturbances in several regions of his body. The muscles of speech will probably not be exempt from this general disturbance. The muscles of respiration, of swallowing, of lingual and mandibular movement will be affected and speech will be disabled. But the cause is in the central nervous system and any remediation must be directed to a re-education of the total as well as the specific neuromuscular systems.

The relation of intellectual inadequacy to speech is not generally understood. Since speech and language are learned, it is obvious that an adequate basic learning capacity and endowment must be present if speech is to develop. All children who have speech disorders must not, however, be judged to be mentally slow or feebleminded. There appear to be also, certain aptitudes for speech learning that must be present in the child in addition to basic intelligence. Not all children have this aptitude to a degree which makes speech learning simple for them.

When speech disorders are the result of interrupted or delayed emotional and social maturation, the treatment of the speech disorder is directed to the psychosocial factors and not the organic ones. In many kinds of speech disorders the child is simply not emotionally or socially ready to speak clearly or to speak at all. Or again his speech development may be blocked, thwarted, or threatened by unhealthy and restricting emotional relations with his peers, siblings, or parents.

Finally, a word about the treatment of speech disorders. It is clear by now, I am sure, that differential diagnosis is highly essential for the treatment of speech disorders. The treatment may involve an integrated and coordinated clinical relationship among physicians, dentists, and speech clinicians. Such a team approach produces a more effective plan of treatment in correct sequence and is child-centered, rather than specialty-centered. The actual speech therapy lies in the professional province of the properly trained speech therapist. Speech therapy must be described as a specialized re-education which may involve all dimensions of the personality: the mental, the physical, the emotional, and the social.

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The Dermestid Beetle Method of Skull Preparation*

B. J. Kruger, D.D.Sc., M.D.Sc., D.D.S.**

Introduction

In the preparation of a skull of an experimental animal for the examination of dental caries, it is usual practice to dissect the soft tissues, separate the mandible from the rest of the skull and then to preserve the specimen, e.g. in 10 per cent formalin. Sometimes the specimens are given a preliminary boil in soap and water or are autoclaved. Both the preparation and the subsequent examination of wet specimens under a binocular miscroscope are messy and time consuming.

Klapper (1954) described the dermestid beetle technique, and recommended it to other investigators. However, the method does not seem to have been used since then, and investigators continue to use the laborious techniques of dissecting, autoclaving and preserving. It is the purpose of this article to redirect attention to Klapper's suggestion, and to describe the technique used at the University of Queensland Dental College.

There are only a few references[1, 2, 4, 5, 6] to the use of the dermestid beetle for cleaning skeletons, even though they were first used for this purpose about 1920.[1, 5] The beetle, *Dermestes maculatus Degeer*[2] has a number of common names: leather beetle (America), skin beetle (South Africa), and larder beetle (Australia).

It is usually not difficult to obtain sufficient adult beetles to start a colony, as they are widely distributed throughout the world. Most of our colony stock was obtained from the hoof room of the local abattoir. With correct conditions for growth, it has been found that only about one dozen adult beetles are needed to start a colony.

Method

The general outline of our laboratory method for cleaning skulls varies slightly from the description given by Klapper[3] (1954). Instead of housing the colony in glass jars, we have used a 14″ x 10″ x 7″ deep wooden box lined with tin. The lining was brought to the outer edges of the box to prevent the larvae of the beetles from pupating in any exposed wood. The box was provided with a tightly fitting lid in which there was a 9″ x 7″ insert of the finest fly-proof gauze. The whole interior was enamelled black and about one inch of pine shavings placed in the bottom—to provide a minimum of light and to protect the larvae.[4]

When an experiment was completed, all animals were sacrified. Each decapitated head was then skinned. Each skull was then placed in an individual compartment in a copper gauze container to keep the mandible with its corresponding skull after cleaning by the beetles. When the colony was thriving with some hundred of dermestids at various stages of the life-cycle, it was found that the colony would clean thirty-six rat skulls in 48 to 72 hours.

As Klapper[3] pointed out, if the termination of an experiment provides more rat skulls than the beetle colony can accommodate at that particular time,

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** Department of Dentistry, University of Queensland, Brisbane.

the residue can be appropriately labelled, and stored in a refrigerator.

It has been shown that meat with a high water content is not readily eaten by the beetles and soon becomes rancid. Because of this, Klapper has suggested that refrigerated skulls be submitted to dry heat (50°-60°) for several hours, before being introduced to the beetles. In our laboratory, we have found this necessary in the initial stages of building up the colony and when using refrigerated skulls, but completely unnecessary when the colony is thriving. When there are no skulls to be cleaned, the beetles can be maintained with meat and bone, e.g. lean chops.

Klapper[3] suggests that after cleaning, the skulls be degreased in dilute ammonium hydroxide for 12 hours, washed in running water for several hours and then dried. In our laboratory this method has also been used and found to be satisfactory. However, a quicker method is to bleach the skulls in 30 vols. hydrogen peroxide for several minutes, wash in running water and dry. The skulls can then be numbered in marking ink and filed in boxes.

There are a number of advantages which make the dermestid beetle method more suitable than other techniques for preparing skulls for *dental caries evaluation:*

FIGURE 1—Rat skull and mandible cleaned by dermestid beetles.

—the skulls are cleaner, more easily branded and more conveniently stored.

—the teeth remain firmly held in their sockets, which makes for easier and more accurate grinding of successive planes (used in most caries evaluations).

—the examination for caries is more easily performed because the tooth surfaces are dry and relatively free of debris.

Results

An example of the cleaning of a rat skull is shown in Fig. 1. The method has also been used for preparing other skulls as museum specimens.

Conclusions

The dermestid beetle method of cleaning skulls has been described and its many advantages discussed. Very little use seems to have been made of the dermestid beetle for this purpose. The method has been found to conserve time, to produce cleaner preparations and to be generally more satisfactory than other techniques. This article confirms the findings of Klapper and adds to his recommendation that other investigators avail themselves of the method.

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Relationship of Pedodontics and Pediatrics

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EDITOR'S NOTE:

You may think that the accompanying paper is of interest primarily to those of us who teach pedodontics, but if you do, you'll be passing up an interesting and comprehensive review of an important facet of any practice which includes children—namely, what we should expect from our coworkers, the pediatricians—and what we should be prepared to offer them.

We suggest you permit your pediatrician friends to read this copy of our JOURNAL, *with special reference to this article.*

A.E.S.

WITH most assignments one can go to the library and find voluminous information on a subject. This assignment proved to be the exception. This should not be interpreted, however, as indicative of a lack of importance of the relationship between the areas of pedodontics and pediatrics. In fact, I am sure you will agree that quite the contrary is true. Certainly all of you will further agree that there are few areas in dentistry and medicine where there is such a common meeting ground and where so much can be done to insure the health and welfare of infants, children and young adults.

I have decided to approach the subject, the relationship of pedodontics and pediatrics, not only from the standpoint of a private practice situation, but also from the position of a teacher of pedodontics, particularly one in a medical center situation where cooperation on diagnostic, treatment and research problems is possible. I intend to discuss conditions and situations with which I believe it is desirable for the pediatrician to be familiar and where his cooperation is invaluable. I am convinced, however, that this relationship is not a one-way street. We must become familiar with the problems of the pediatrician and in addition teach our students, including those at the graduate and intern level, to be familiar with these problems or at least to have a communicating knowledge of them so that there may be a free exchange of ideas.

It is possible for the relationship between pedodontics and pediatrics to be evident early in a child's life. It is not uncommon for the pediatrician to be the first one to examine the child's mouth. Even though members of the dental profession recommend that a child be examined at least by the age of two and a half to three years, parents do not always follow this advice and unless some abnormality is noticed, or the child has an accident, the first dental appointment is often delayed. Dental caries and many oral anomalies are evident early in a child's life and the pediatrician in his routine oral examination of a child can often detect deviations from normal and refer the child to a dentist for treatment.

EXAMINATION FOR GINGIVITIS

In the pediatrician's examination of a child's mouth, the soft tissues, particularly the gingival tissues, should be carefully observed since they often show the first deviation from normal oral or general health of the child. Members of both professions must be aware of the

etiology and implication of gingivitis in children. Though it is true that severe gingivitis is rare in children, except when it accompanies a severe systemic disturbance, a mild type of gingivitis or inflammation of the superficial part of the periodontal tissue which surrounds the cervical portion of the teeth is common. Though it is seen frequently and many minimize its significance, the pediatrician and the pedodontist should constantly look for this type of gingivitis in the routine examination and attempt to classify the abnormality as to cause, type and treatment. The gingivitis most often seen in a child is caused by lack of oral hygiene and by the accumulation of food debris, calcareous deposits, or other local traumatic and toxic agents between and around the necks of the teeth. Since there is usually a mild, progressive inflammation and there is seldom any pain associated with it, there is a tendency for the patient to ignore it. The degree of severity of gingivitis is no doubt related to the general health of the child and influences the general destruction of the supporting tissues.

In the future there must be increased interest in the problems of periodontal disease in children. It has been estimated that approximately 30 per cent of young adults have disease of the periodontium which started during childhood or adolescence. There is an urgent need for combined consideration of this problem, not only in the treatment of the individual patient, but also from an investigative standpoint, in the search for etiological factors responsible for this condition.

Non-Vital Teeth

In the pediatrician's examination of a child's mouth a careful search should be made for evidence of non-vital teeth. We are well aware that it is not uncommon to observe areas of localized swelling and redness which are usually indicative of periapical infection with a rarefaction of the bone. The involved tooth can be observed to be quite loose and there may be evidence of an exudate around the tooth. Unerupted permanent teeth that have undergone growth and calcification in an area approximating the alveolar abscess often erupt showing evidence of the abnormal local environment. If the area of bone involvement surrounding the developing tooth has been extensive, the crown may show evidence of hypocalcification or hypoplasia and may be quickly attacked by dental caries. Occasionally a cyst will develop around the unerupted tooth and the tooth germ may be destroyed even before eruption.

Another reason that it is important to discover non-vital primary teeth is the fact that the roots of these teeth will seldom undergo what we consider to be normal physiologic resorption. Instead they may remain in the alveolar bone or soft tissue as foreign bodies to deflect or prevent the eruption of permanent teeth in the area.

It should be recognized by the pediatrician that even carious primary teeth that are apparently causing the child no difficulty can be very detrimental to the child's general health and development. These children may have been spared the pain of a severe toothache; however, if we observe them carefully when they try to chew coarse foods we will notice that they experience difficulty and often discomfort. This fact in itself causes many children to develop the habit of eating the softer, usually the high carbohydrate and often less nutritious foods. With restoration of badly broken down teeth the dietary of the child inevitably improves, they frequently gain weight and there is

a change in their total health picture.

It should readily be recognized by the members of both professions that, in addition to dangers just cited, badly decayed and non-vital teeth serve as incubation areas for micro-organisms. It is impossible to reduce the oral bacterial count until the involved teeth have been removed or treated and adequately restored. Because of the local environment, sound teeth in the area may become carious. This fact is reason enough to recommend the removal of badly broken-down or non-vital teeth.

Chronically Ill Children

The pediatrician and the pedodontist should work as a team in the management of a child with a history of rheumatic fever, nephritis, or similar conditions. A thorough physical examination should precede any dental surgery and consultation regarding antibiotic prophylaxis is in order.

The pedodontist must be aware of the potential danger of a pulpless tooth to the well-being of a child, particularly the one who is suffering from chronic illness. It has been shown that positive blood cultures can be obtained following vigorous mastication if there are pulpally involved and apically abscessed teeth in the mouth. It, therefore, seems unwise to attempt to treat pulpally involved teeth in children with a history of chronic illness, if the outcome of the treatment is questionable.

Diet and Dental Caries

Dental caries continues to be our number one problem in dentistry and in everyday practice should receive our major attention, not only from the standpoint of restorative procedures, but also preventive procedures designed to reduce the problem. Many studies have recently been conducted to determine the dental needs of children and young adults. Almost without exception from the results of these surveys we learn that the dental caries problem is still acute. In some areas of the country over 22 per cent of the two-year-old children and 52 per cent of the three-year-old children have been found to be in need of dental care.[1]

Since dental caries is so widespread, even in the pre-school group of children, both professions must realize the importance of informing the public of the cause of the disease and preventive and corrective measures that can be instituted in its management. The members of both professions can practice preventive dentistry by endorsing and recommending all of the accepted preventive procedures for the control of dental caries. Their further responsibility is to consider the general health as well as the dental health of the patients in their practice.

We are all aware of the many practical dental caries control measures that are applicable to a private practice. For the most part these preventive measures are not necessarily new. It is impossible, however, to emphasize too strongly that there is no one dental caries control measure that will be entirely satisfactory and which will solve the dental caries problem for a given child. Unquestionably the pediatricians are aware of this and they can assist in making this fact known to parents.

Many believe that the correction of dietary inadequacies and the reduction of freely fermentable carbohydrates are the most important dental caries control measures. Even though you may not subscribe to these as being the most important control measures, I think that we can agree that they are important

considerations for the dental, as well as the general health of the child. This is certainly an area where the pedodontist and the pediatrician can combine forces to attack the dental caries problem.

Recent research findings indicate that to the pediatrician, or even the obstetrician, may fall the task or responsibility of initially influencing dental caries susceptibility. In laboratory animals it has been found that, when the diet of the mother is very low in fat and when all of the carbohydrate is furnished in the form of sucrose, the offspring have a significantly higher incidence of caries than do the offspring of mothers subsisting on natural diets.[2] There have also been studies which strongly suggest that an excess of carbohydrate administered during the suckling period may result in increased caries susceptibility. There is further evidence to indicate that the carbohydrate resulting in the least increase in subsequent caries is lactose. If breast feeding is impossible, then it may be well for the pediatrician to give consideration to a formula in which lactose is incorporated as the carbohydrate.

Few would dispute the statement that more eventual health benefits can be accomplished for the nation as a whole through proper nutrition of the infant and young child than by any other combined efforts of the medical and dental professions.

In recent years numerous studies have called attention to the importance of an adequate diet in a dental caries control program. In this endeavor the two professions should join forces to improve the dietary of child patients and concurrently strive to reduce the dental caries problem. Inadequate amounts of foods which comprise the fruit-vegetable group and dairy products group likewise have been shown to predispose the child to increased caries activity. The fact that between-meal snacking on cariogenic, refined foods is also responsible for much of the dental caries problem should be emphasized by members of both professions.

Undoubtedly one of the most frequent comments or complaints heard within a pediatrician's office is, "My child doesn't eat enough." A frequent question is, "What vitamins should my child take in order to make him eat better?" The pedodontist often hears a mother remark, "I can't understand why Johnnie has so many cavities, he drinks gallons of milk." I think that we should analyze these remarks because they represent common misconceptions regarding childhood nutrition and also the etiological factors of dental caries. Many parents believe that all that is needed for a child to be well-nourished is a quart of milk each day. This they believe should be given regardless of his age, likes, dislikes, or capacity. This amount of milk during the pre-school years may actually interfere with the eating of solid protein foods, such as meat, eggs, fish and cheese. It is often true that it encourages eating of excessive amounts of starchy foods and sweets, which are washed down so conveniently with milk.[3] Milk is probably the most important food in infancy because the child needs large quantities of liquids. With the beginning of the second year, however, milk becomes less important. The toddler who drinks milk and eats no solid protein foods frequently does not obtain sufficient protein. Since milk is bulky, it satisfies hunger so that the child may have no desire for other basic foods. This may be responsible for initiating the snacking habit, which is so commonly observed.

Both the pedodontist and pediatrician should keep in mind some basic rules

for feeding children satisfactorily. To counsel parents regarding the eating habits of their children, I believe is within the scope and the responsibility of the pedodontist or even the general practitioner of dentistry. There are a number of basic rules which, if properly understood and practiced within families, would eliminate most feeding difficulties and in turn reduce the number of carious lesions.

I believe that is is generally agreed among pediatricians that parents should not force a child to eat. We are well aware that such action can only result in a decreased food intake and increase in the hatred of foods. This is particularly true of the two to four year age group, which is often referred to as the period of negativism, or the period of contra-suggestibility. If a child does not choose to eat at mealtime, the food should be taken away after a reasonable period of time and nothing else offered until the next meal.

Parents need to be informed that in order to establish good eating habits, it is very important that the child be permitted to become quite hungry in order to learn through experience the pleasure and satisfaction derived from eating proper foods at proper times. Between-meal eating can be quite harmful to the desirable eating pattern that we hope to establish in young children. There is little doubt that this habit is directly responsible for an increase in dental caries, particularly if the between-meal snacks are made up of cariogenic foods.

Oral Habits

One of the neglected areas in pedodontics, and probably I would be on safe ground to include pediatrics, is related to psychological and emotional problems of children. Most often these problems are brought to the attention of the pedodontist when there is an associated oral habit, such as thumbsucking and here is another area where cooperation between the two professions must be improved.

I am confident that oral habits are frequently overlooked by the dental profession and I assume that this is also true of the medical profession. Careful observation of the occlusion, a glance at the child's hands, and casual questioning should readily provide the clue that the problem exists. Questions such as, "How do you stop thumbsucking?," or "What kind of a gadget can we use to correct a habit?" are often posed by students and our medical and dental colleagues. These questions should be considered evidence that this has been a neglected area and one that is ripe for "team" consideration.

It should be realized that thumbsucking is not always harmful to the occlusion. In fact, occasionally the occlusion, particularly in cases of prognathism, is benefited by the thumbsucking habit. Neverless, we must always be aware of the potential damage to the denture and the psychological implications of the habit, which if continued over a period of years, is not socially acceptable.

I believe that it is the obligation of the pedodontist and the pediatrician to point out to the parent any existing damage to the occlusion and predict the final result, should the habit be continued.

It seems unrealistic to counsel a parent regarding treatment or correction of the habit until the cause is determined. It is probable that some oral habits had their origin when there was a feeding problem. Others may be the result of imitation of a playmate or brother or sister or occasionally may be classified as nothing more than an empty, mean-

ingless habit. Often the cause may be obscure and may be related to a feeling of insecurity and maladjustment or complex problems in the home environment. It is often impossible for the dentist or physician to determine the basic underlying cause of the habit, in which case the child and parent should be referred to a specialist in the field of child psychology. However, a statement of Dr. Leo Kanner, Professor Emeritus of Child Psychology at Johns Hopkins University is worthy of note: "Ordinarily, the everyday reactions of the child do not and should not come to psychiatric attention. Those children who are brought to child psychiatrists' offices and clinics have usually started, already at least part of the way, on the road to surrender, withdrawal, or rebellion. The job then is to return them to comfortable and smoothly functioning normalcy. But in the vast majority of instances, the management of normal early resistances, the handling of the little feeding, bedtime, elimination, truth-telling, thumb-sucking, fear, anger, jealousy and other issues should be a matter of parent education, most logically left in the hands of pediatricians. It is the pediatrician who can help parents to understand what is going on between themselves and the child. This is done neither by agitating the parents about the significance of these problems with the prescription of appetizers, tonics, sedatives and tranquillizers nor by using the phrase: "Pay no attention. He'll outgrow it." The overanxious parent needs help to see things in their proper perspective. The obsessive parent needs help to accept her or his child as he is and not as a model of non-existing perfection. I would be more apprehensive about the child who has surrendered to the degree of never showing a so-called problem than about a youngster who learns to assert his spontaneity and identity, if need be with the help of an occasional departure from infantile saintliness."[4]

Areas for Cooperation

Chronically ill children and handicapped children often require a coordination of efforts of the pedodontist and pediatrician for the successful diagnosis and management of the case. Children with conditions such as rheumatic fever, congenital heart disease, blood dyscrasias, Banti's disease, epidermolysis bullosa and endocrine imbalance, to name just a few, require special consideration by the pedodontist. He must seek the counsel of the pediatrician or the physician responsible for the child's general health. The pedodontist, before he undertakes extensive treatment for the seriously ill child, must determine the life expectancy and the course of treatment that is being followed. In less severe cases he must likewise be briefed on the course of treatment and medication the child is receiving. In cases of undiagnosed fever, the pedodontist should be called on to provide a complete oral examination in order to rule out the possibility of infection of the teeth and associated structures.

Not infrequently the pedodontist is the one who sees the first evidence of one of the xanthomatous diseases. These children with an oral condition, often somewhat resembling Vincent's infection or with loosening and spontaneous loss of teeth, frequently are referred to the pedodontist by other dentists or physicians. Although a pedodontist cannot confirm a diagnosis, short of a complete work-up, referral to and consultation with a pediatrician will result in proper management of the case.

I cannot refrain from mentioning

something about which I feel very strongly and which we must consider if we expect and deserve the recognition and cooperation of the pediatrician.

Throughout this paper I have used the term "pedodontist." Perhaps this term should have been defined early in this presentation. There are many dentists who limit their practice to children and there are many pedodontists in the dental profession. It is often unrecognized by the medical profession and the general public that the background, the experience and the scope of endeavor of the two groups is often quite diverse. My definition of a pedodontist is one who provides dental care for children and who has prepared himself for this endeavor through a recognized discipline of graduate training or internship, or residency.

In 1937, a pediatrician writing on the relationship of pediatrics to pedodontics made the following statement: "The prevention and treatment of any disease in childhood necessitates the utilization of all available recognized medical and dental aids. But in actual practice, many of us have been confused and disappointed in the lack of cooperation between the two professions. Perhaps this is true because the pediatrician has too long considered the dental profession as one that merely employs mechanical techniques and should have nothing to do with the physical condition of the child beyond those conditions related to the teeth and the immediately adjacent structures."[5] Today the modern pedodontist with his experience in the field of dental pediatrics in graduate programs or approved pedodontic internships and residencies has a basic understanding of the pediatric problems, particularly of those overlapping our field. There still is much room for improvement, but great strides are being made.

In 1949 there were only 7 graduate programs available to those interested in advance study for the purpose of practicing or teaching the specialty of pedodontics and only 11 schools or clinics offered postgraduate training in the field. The growth in pedodontic graduate and postgraduate programs has been nothing short of spectacular. At the present time there are 20 pedodontic graduate programs and at least 17 schools or hospital clinics offering postgraduate or internship training in pedodontics. Today with graduate and other forms of continuing education available, the "short cut" to a practice devoted to the dental problems of children seems indefensible to me.

Handicapped Children

During the past decade the members of the dental profession have come to realize that a forgotten group of children, those with a physical or mental handicap, often have not received adequate dental care. Until very recently, the problem of providing dentistry for the handicapped child was much the same as the situation in which we found ourselves twenty years ago when we attempted to find someone to provide routine care for the normal child. Prior to that time, too little emphasis had been given to this important subject. Today it is rare to find the office where the child patient is not welcome. We must solve, and we are solving, the problem of dentistry for the handicapped child in the same manner. With a complete understanding of the child's disability, which often can come only after consultation with the pediatrician, the child usually can be handled as a more or less routine case. A small percentage of severely handicapped children can be

managed only while they are under a general anesthetic. Here again the relationship with the pediatrician must be considered. The anesthesiologist will expect, and rightfully so, that the child have a complete preoperative work-up. This should include basic information which can be obtained from complete examination, including urinalysis, complete blood count, determination of clotting time and a radiograph of the chest.

Cooperation in Research

Dr. Norman Olsen recently prepared a manuscript describing current research activities in pedodontics.[6] The research encompassed almost all facets of dentistry, the majority of it being, however, in the general areas of growth and development, dental materials, vital pulp therapy and dental caries. There are active research programs in most of the dental schools today. In many instances these programs have developed as a result of the establishment of graduate, internship and residency programs. Even to the casual observer, however, there are voids in our knowledge and there are many areas that need immediate attention. Some of these lend themselves ideally to a combined effort between pedodontics and pediatrics. The area that needs most urgent consideration is that of child behavior management. There is little information other than personal opinion to guide the pedodontist and pediatrician in the management of behavior problems in the office. In the future we must find the answer to why some children react as they do to the dental experience. We could learn through coordinated, well-controlled clinical studies the extent to which we can use practices such as voice control, physical restraint and drugs to help us solve behavior problems.

Closely related to the child management problem is that of oral habits. In perhaps no other area of dentistry is the literature so confusing and contradictory. To my way of thinking, the exact role of the pedodontist and the pediatrician in the management of oral habits, such as thumbsucking, has not been determined, but with cooperative efforts and liaison with psychologists and psychiatrists we will gain information necessary to understand the basic cause of such reaction on the part of the child. This liaison has already been established between the A.S.D.C. and the American Academy of Pediatrics and a joint consideration of the dental caries problem has been completed. This work must be continued to include other areas of mutual interest.

A Pattern for Education

How can a closer relationship between pedodontics and pediatrics be realized? How can we become better acquainted with each other's problems to the benefit of the child? We have made an approach to this problem at Indiana University with gratifying results. Greater emphasis is being given to this consideration at the internship and graduate student level; however, we are attempting to make even the senior student aware of the medical problems of the child.

A series of lectures is presented to the seniors by the pediatrics staff and others responsible for the specialized teaching program in the children's hospital. The following areas are considered in this survey course: general pediatric problems including diagnosis; congenital and acquired heart conditions; cleft palate surgical considerations; orthopedic procedures and endocrine problems in children. The series of lectures is pre-

sented at a time when the students are engrossed in clinical procedures needed to complete their requirements for graduation and when there is need to reemphasize the total health problem of the child and prepare them to accept this responsibility in practice.

The response of the pediatrician and his medical colleagues and their willingness to participate in the lecture series has been most gratifying. Their contribution to the senior students has been extremely well received. However, it should not be overlooked that there are other far-reaching benefits. Participation in the program by the physicians has necessarily caused them to become more aware of the dental problems of the child and also more familiar with dental education in general. This will result in increased cooperation and coordination of efforts in the future.

In recent years members of the pedodontics staff have been invited to present lectures to the pediatric residents. This has come about through a realization by the pediatric staff that many dental problems in the past have gone unrecognized and that there is a necessity for free exchange of knowledge in the total health consideration of the child. The pediatric residents are the practitioners of tomorrow and it is our desire to indoctrinate them by means of a cooperative program with our philosophy regarding an adequate treatment and preventive program for children.

On the other side of the coin it must be stated that our dental interns and graduate students must become familiar with some of the basic aspects of pediatrics. Arrangements have been completed for them to audit the pediatrics course offered to medical students. In addition, they make regular ward rounds in the children's hospital and observe diagnosis and treatment methods. Thus, they acquire a vocabulary and a working relationship with the pediatricians. In the hospital program our interns are called upon to assist in diagnosis and management of cases. Consultation requests, a rarity fifteen years ago, are now commonplace and serve as stimulus to a close working relationship between both groups. The chairman of the clinical pediatrics department has expressed the view that every child coming to the outpatient clinic should be examined by a representative of the pedodontic department. This, of course, we would welcome. This would be a valuable adjunct to our teaching program, but in addition, we recognize that in this endeavor we would rub shoulders with the medical students, interns and residents and would have an opportunity to inform them as to the role dentistry plays in the total health picture. Here the total health of the child would be considered and it is virtually impossible to estimate the cooperative and investigative stimulus that it would afford.

Occlusion Problems

Another problem encountered by both the pedodontist and the pediatrician is that of malocclusion. The pediatrician, because of the nature of his practice, has an opportunity to note deviations from normal that indicate impending malocclusion. He should be aware that tardy or delayed eruption of the primary or permanent dentition by several months should not be looked upon with alarm providing the eruption is following a symmetrical pattern. Both the pedodontist and the pediatrician must be aware that a delay in the initiation of eruption of primary teeth beyond one year may be related to a systemic or congenital condition. Those conditions

most frequently associated with marked delay in eruption are mongolism, cleidocranial dysostosis, cretinism, and hypopituitarism. When there is delayed eruption of individual teeth the cause should immediately be determined, since delayed eruption of individual units is often followed by loss of space and malocclusion.

Approximately 5 per cent of all children fail to develop some of their teeth, this figure being in addition to the absence of third molars. What is sometimes mistakenly interpreted as delayed eruption may be verified radiographically as the congenital absence of teeth. In the case of missing teeth it is important for the pedodontist or orthodontist to see the child early in order that a long-range treatment plan can be outlined. It is important to determine early whether spaces resulting from missing teeth should be closed or held open for future prosthetic appliances.

It has been estimated that the largest increase in population between now and 1975 will come in the age group ten to nineteen years. This group is expected to increase by about thirteen million or 53 per cent. This results from the high number of births beginning in the mid 40's. This is the age in which we observe irregularities in the development of the occlusion and when proper guidance can mean the difference between a functional occlusion and one which can only be corrected by major orthodontic treatment. It is improbable that orthodontic graduate programs can expand sufficiently to increase the number of specialists to meet the challenge. A solution to this problem lies in greater cooperation and liaison between the orthodontist and the pedodontist, and in turn between the pediatrician and the two groups. With the working knowledge of the causes of malocclusion and the recognition and the diagnosis of incipient irregularities, the pedodontist can often intercept irregularities other than those of the skeletal type and make an important contribution to the dental health of the child or young adult.

Many irregularities in the occlusion should be diagnosed and treated early in the life of the child. In fact some types of malocclusion may first be seen by the pediatrician, particularly if the parents have delayed the first visit to the dentist. The concept is no longer held that malocclusion should be treated only after the eruption of all of the permanent teeth. While it is true that it is desirable to treat some of the more complex irregularities in the permanent dentition stage, other types are ideally treated in the primary or early mixed dentition stage, a time when many preventive and less complicated corrective measures can be instituted. Anterior and posterior crossbite, extreme overbites accompanied by damage to soft tissue, space closure created by untimely loss of primary or permanent teeth and malocclusion resulting from the presence of supernumerary teeth are examples of conditions that can readily be observed by the pediatrician and which constitute a basis for early referral. It is generally agreed that these conditions fall within the realm of treatment by the pedodontist.

Future Trends

Dr. J. R. Blayney recently made a prediction that the practice of dentistry, particularly the practice of dentistry for children would in the forseeable future take the same course as pediatrics.[7] He pointed out that 30 years ago the pediatrician spent as much as 90 per cent of his time treating childhood diseases.

but today the pattern of his practice has been completely reversed. Now he spends less than 10 per cent of his time treating diseases, while the majority of his time is spent practicing preventive measures designed to prevent not only infectious disease, but deficiency states as well. Is it incorrect to assume that preventive measures for the control of dental caries are now available? Many of these measures have been proven beyond a doubt to be effective. Perhaps we need only to educate and convince the public and ourselves of the merit of these procedures and their importance in the total health problem.

I am convinced that in the future we can look to the pediatrician to assist us greater extent in our preventive program designed to reduce the dental needs of children. Increased dietary counseling for the control of dental caries, early recognition of dental problems and subsequent referral, and greater assistance in the management of psychological problems and oral habits will be invaluable aid to the pedodontist and to the dental profession as a whole in meeting the challenge in the decade ahead.

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Hypodontia and Hyperplasia: A Case Report

FRANCES B. GLENN, D.D.S.

SUPERNUMERARY and congenitally missing teeth occur in the mouths of children and adults. Other than in cases of ectodermal dysplasia, cleidocranial dysostosis, cleft palate, etc.; it is rare to see both hypodontia and hyperplasia occur in the same mouth in an otherwise physically normal child. Thoma[1] states that supernumerary canines are extremely rare and are more common in the upper than the lower jaw.

A genetic correlation and family patterns are seen in developmental disturbances.[2]

The following case report is presented as an interesting finding of a congenitally missing maxillary second bicuspid and concomitantly present supernumerary mandibular canine.

CASE REPORT

J. M., 9½ yrs., was seen in the office for routine examination on August 26, 1958. Intra-oral radiographs disclosed the maxillary right second bicuspid to be congenitally missing. In the mandibular right canine region a partly calcified mass was noted in the radiograph between the lateral incisor and unerupted canine midway inciso-apically (Fig. 1). Radiographic findings did not rule out the possibility of an odontoma.

On October 17, 1958, under local anesthesia, an incision was made along the mandibular ridge and a flap retracted lingually. The mass was found to be lingual to the unerupted canine and erupted lateral incisor but labial to the lingual alveolar plate of the mandible. Access to the mass was gained by the use of a No. 558 fissure bur in an air-water turbine handpiece and it was removed from its bony crypt and placed in formalin solution. Healing was uneventful. Pathology report was returned with diagnosis: supernumerary canine.

FIGURE 1

SUMMARY

The necessity for routine radiographic survey of children's mouths is substantiated by the above case. While supernumerary teeth in this area of the mouth are more uncommon than elsewhere in the mouth, early diagnosis is paramount, thus prohibiting damage to adjacent normal teeth and bone.

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Pedodontics in Russia*

JOSEPH GARY, D.D.S.**

IN 1932, I had the opportunity to visit Russia, to observe dentistry for children, and compare it with the work we were doing at that time at the Murray and Leonie Guggenheim Dental Clinic. This interest matured through the years, and after a year's planning and many letters to the Russian Ministry of Health in Moscow, the Minister of Dental Education of the USSR agreed to invite me to survey the scene of dentistry for children in the Soviet Union (1959).

We drove from Paris to Moscow via Berlin and Warsaw; then covered the entire area from Moscow through the Ukraine, through the Crimea to the Black Sea at Yalta, then north again to Leningrad and the Karelian Isthmus, a total of over 4,000 miles. We visited eleven cities, many towns and villages, Dental Institutes, Ministries of Health, Institutes of Public Health, Polyclinics, Dental Centers, Children's Clinics, District Clinics, Factory Clinics, Sanitoria and Rest Homes.

In Moscow, we were received by the Director of the Dental Division of the Ministry of Health who eased the path for us throughout our travels. The Institute of Public Health in Moscow gave freely of information concerning the work being done in the USSR in all the fields of health and welfare of children. They have an extensive division devoted exclusively to the organization, production and distribution of all health propaganda. We were shown excellent movies as well as their newest posters, transilluminated educational displays, books and folders.

There are two types of Dental Specialists. These were defined for me as follows:

1. *Stomatologist*—"A real physician with higher medical education, who has all the rights of a physician with general medical education and can do everything in surgical rehabilitation."

2. *Dentist*—"The dentist is not a physician. His background is the regular ten year school education plus three years of dental training."

The educational program for dentists will be gradually eliminated within the next four to five years and only the education for the stomatologist will be continued. This had been a problem in dental education for a number of years, but is now definitely settled. As far as the Board of Higher Education is concerned, the only problem existing now is the question of distribution of the small number of stomatologists.

Nine new Faculties and Centers of Education have recently been opened, making a total of 22 in all. Last year, 1,000 stomatologists as well as 1,000 dentists were graduated. This year, the number increased to 2,500. As the new facilities become available, there will be proportionate increases yearly. Of the 45,000 members of the dental profession today, 12,000 are stomatologists. In five years, it is planned that an average of 3,700 stomatologists will be graduating annually. The education of the average stomatologist consists of the normal ten

* Presented before The American Academy of Pedodontics, Sept. 10, 1959, in New York City.

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year basic schooling from age 7 to 17 years, followed by five years in a Medical Institute which is actually a College of General Medicine. The first two years at the Institute are practically the same as ours in the study of the basic sciences such as chemistry, anatomy, bacteriology, physiology, etc. They also include a second modern language and English is the usual choice. In the third year, the students take general clinical subjects, including everything from general surgery, oto-laryngology, to obstetrics, but stomatologists concentrate on their future specialty, which is divided into three phases:

1. Therapeutic Stomatology which is actually general dentistry. This includes courses in pedodontics.

2. Surgical Stomatology, including maxillo-facial surgery.

3. Orthopedic Stomatology which is equivalent to prosthetics and orthodontics.

These courses are given in the third, fourth and fifth years. At the end of the third year, the student begins working with the actual patients under supervision. In the fifth year, he is permitted to work as a dentist on his own, without supervision, in town clinics, with periodic consultation. During this time, he also works one full month as a general physician, wherever he may be assigned. After passing the State Examinations, he is awarded a diploma which is the same as a physician receives except that it is specified that he is a stomatologist. All graduates are assigned through the Soviet Union according to a master plan by the Ministry of Health in Moscow. A master list is made up of requests from the entire Soviet Union and men are assigned to the various areas requesting their services. A choice may be given if very special reasons exist, such as family ties. Special consideration is given to females. The proportion of female dentists is today approximately 75 per cent but this will be decreased to approximately 60 per cent.

Beginning practitioners receive 900 rubles a month which is equivalent to $90. (The ruble is officially worth 10 cents.) Increases are made over a period of 25 years to a maximum of 1,500 rubles per month for the average practitioner.

The head of a department receives 1,800 rubles monthly and professors may obtain up to 5,000 rubles per month. Research is encouraged by additional monetary rewards for individual findings. The well established research worker may get a double salary. Those qualifying for the degree of M.A. may receive 2,500 to 2,800 rubles per month. A Ph.D. may receive 3,500 to 4,000 rubles. The hours of dental practice are from 8 a.m. to 8 p.m. Service is maintained by two shifts, each working 5½ hours, six days a week. Private practice does exist, to a very limited degree, only amongst the older practitioners. Since education is paid for by the State, the practitioner must work for the State. Private practices are subject to special checking by the City Sanitary Inspector and must first obtain local approval. For example, in the city of Leningrad, with a population of 3,500,000, there are only 67 private practitioners. In many towns, there are none.

Many inducements are offered to men to become specialists and devote their time to children's work. These include extra vacations, extra pay, and choice of area.

Each Republic has its own Ministry of Health. The general budget comes from the National Republic. City, town and regional boards are part of local councils. In most towns, the regional polyclinic serves both the town and its surrounding area and includes all medical

services as well as general dentistry. In large cities, there are special clinics for children only. In general, children's departments are maintained in polyclinics. Dental care for children exists in two forms; the emergency treatment wherein the child can be brought by its parents for treatment, when he is in actual pain and "the main form of treatment." The "main form" is a planned program of dental care for all children in schools. They are examined twice a year by a stomatologist after which they are referred to the school dentist for treatment. No parental consent is required. In large cities, 90 per cent of children are under this program. The chief problem is manpower, and although a shortage of dentists still exists in the individual Republics, it is hoped that this will be overcome in the next five years. I have been told that money is no object.

Application of fluorides to the teeth was popular, but results were contradictory. In areas where natural fluorides occur in the water supply, they admit that caries is less, but are disturbed that caries still exists. They show for example, that in Poltava in the Ukraine Republic where there is endemic fluorosis, the prevalence of caries is 40 per cent compared with 90 per cent in Leningrad where there is no fluorine in the water supply.

There is considerable misinformation as to the use of flourides in the U. S. A. They claim to have reports showing that we have been using 3.0 ppm of fluorine in our water supply. They believe that this level may cause arteriosclerosis.

A good deal of research is being carried out in the effects of trace elements and sugars on caries, on artificial caries and with radio-isotopes in salivary studies.

Children to the Russians are a very valuable asset. In eacn of the health service areas, except the Factory Clinics, provisions are made for children either exclusively or in part. In many towns children have for their exclusive use, complete railroads which they own, manage and operate. These railroads cover eight or more kilometers. There are complete Children's Fire Departments, Stadiums, Pioneer Palaces, Parks, Department Stores, Sanitoria, Camps, Clubs, Statues and Monuments. Many sanitoria are located in former Czarist Palaces and are exclusively for children with rheumatic, respiratory ailments, etc. There is even a Department of Propaganda, especially for children.

The largest center for health service in the average town is the local Polyclinic which services the town and its adjoining area for all the medical needs of its population. Within this Polyclinic is the dental clinic with one section devoted to children, and in many instances, a section for education of young mothers, pre- and post-natally. In the large cities, as Moscow and Leningrad, more lavish arrangements have been made and are being made for the exclusive dental treatment of children.

The welfare of the future child begins in the pre-natal clinic. Young mothers, through the free medical system are immediately conditioned to the proper means of caring for the young. This includes everything from dietary information for the young mother to home care during pregnancy, as well as intensive information regarding diet, diapering, washing, sanitary hygiene, clothing, feeding of the child.

A great deal of emphasis is placed on breast feeding, even unto milk banks which are available to young mothers who are unable to breast feed their children. Mothers are intensively trained. For example, they have a complete follow-up system as well as a testing system to

check on the mothers until they know that the mothers are efficient and can pass all procedures necessary in raising children. Visual aids abound in their education from pre-natal to the age of one an one-half years. Throughout Russia, there is a wide network of these special consultation centers. Mothers are registered and not only must appear at regular intervals, but they are visited before and after birth at home. Maternity leave is paid for by the State and subsidies are paid to the mothers on the basis of the number of children in the family. Since everyone works in Russia, the employed mother continues with her salary while on leave of absence from her employment which is for 56 days before birth and 56 days after birth. If she so desires, she may also get one year of leave without pay. No births take place at home.

From birth to the age of three the child is provided for and maintained in a Yasly. From three to seven he goes to a Dyetskysod which is a Kindergarten. Formal schooling begins at the age of seven and continues for ten years to the age of seventeen. Children are extremely well cared for. Of particular interest to us was the question of habits. The child is never too young to accept responsibility in his relation to those around him. Among the thousands of children I saw during my entire trip, I did not see a single case of a withdrawn child or a thumb-sucker. When I inquired into the thumb-sucking problem, I was told that no such problem exists. Children are taught beneficial habits and appear to learn quickly what they are taught. Schools have health posts, staffed by children and these children see that their mates adhere to all proper habits and hygienic rules. If a child is occasionally found to be remiss, the system of control by other children is apparently very effective in correcting the fault. Russian research and comparative studies abound to show the superiority of, and the influence of the Yasly and the Dyetskysod in raising children, as compared to the custom of raising them at home.

Problems of oral hygiene are not separated from problems of general hygiene. Teaching of toothbrushing with practical demonstrations, pictures, films and books as well as instruction to mothers begins at age three and one-half to four years of age.

In the average city, outside of the great metropolitan centers, for example, Kharkov, children have split sessions in school, allowing for full-time service in the Dental Clinics. Children are thus treated in the Children's Dental Department of the Central Polyclinic outside of their school time. Although the total personnel of the Polyclinic consists of 120 operators, four stomatologists are in the exclusive service for children. Statistics on the total number of children treated as well as other statistics are not available, except in the Orthodontics Department. There, we were told that last year 200 applications were filed for orthodontics, but only 80 could be treated and the rest had to wait. On the average, 120 cases were treated annually by two stomatologists and completed each year. When broken down, the average treatment for orthodontics consists of two weeks to six months. Very rarely cases may require a year to a year and a half for completion.

Diagnoses and treatment planning never include a full mouth series of x-rays. The use of the x-ray throughout the Soviet Union is always dependent on the clinical judgment if the individual operator. Now with the issue of radiation damage, even single film x-rays seem to pose a problem. In all examinations,

the visual judgment of the individual operator is the chief diagnostic agent.

The city of Leningrad is probably the best example of the attempts made to concentrate on and justify full dentistry for children. The city with three and one-half million people is divided into twenty-one districts. There as 256 Stomatological Stations. They were originally independent but are now centralized to obtain better standardization. These Stomatological Stations include:

1. Health Centers, Sanitoria, and Factories.
2. District Stomatological Clinics.
3. City Stomatological Centers.

Children's Clinics are part of District Clinics. Last year, two exclusive Children's Clinics were built within public housing to care for the total needs of the district. Many more are projected with the ultimate hope of encompassing not only the whole city but to set an example for the rest of the Soviet Union. In the city of Leningrad, one person out of every 283 is in the Health Services. As of July 1959, there were somewhat over 2,000 stomatologists and dentists for the city of Leningrad. The city provides a centralized home service in dentistry for those who are not ambulatory and are bedridden as well as emergency services. Follow-up service is also provided for children in summer camps. The dentist continues the treatment begun in the school year, as well as check-ups and clinical planning, both in dentistry and general health for the ensuing year. Since there are no births at home, all children with either abnormalities or defects are picked up at birth, recorded and special continuous care provided. When surgery is indicated, it is provided at the proper age. An average of approximately 100 cases a year of cleft palate, harelip, saddle nose, ear defects, etc., are treated annually. Special children's clinics for rheumatic diseases have also been opened. All these treatments are now compulsory and the consent of the parent is not necessary.

The First Leningrad Stomatological Institute and Clinic has 65 stomatologists. Eight are children's specialists, and five are orthodontists. They treat children between the ages of seven to seventeen on a budget of three and one-half million rubles a year. Their ratio for children is one stomatologist to every 2,000 to 2,500. For adults, there is one stomatologist for every 5,000. They also send dentists to the rural areas as well as to summer camps. There is one dentist for every 200 children.

Although most of the work had been done in the winter, the new plans include doing even more work during the summer months in camp, to ease the winter load. Since the children are concentrated in these camps, complete examinations are undertaken, not only for their dental health but their general health as well. These diagnoses are followed through when the children return to the city. All services are free through the age of seventeen.

Throughout the Soviet Union, films dealing with all phases of health, including the problems of dentistry are shown in public cinemas before the regular features.

When questioned as to budgetary sources we were repeatedly told that money is no object. The serious difficulty is material and manpower.

Although we were repeatedly told that dental examinations begin at the age of three and one-half to four, which is when the child enters the Dyetskysod, the actual attention to disorders other than surgery does not commence until after they begin the ten year school program.

from seven to seventeen years. Semi-annual examinations between the ages of seven and eleven are routine, and from twelve to seventeen examinations are made once yearly. In spite of this, it seems that many children show either the ability to escape the examination or produce cavities at a rate faster than they can be filled. Perhaps clinical examinations without the use of x-rays produce havoc. The lack of prophylactic care showed the effects of shortages of manpower.

In Operative Dentistry, the individual operator has complete freedom of choice of the technique of cavity preparation. The great majority of fillings are done by women dentists and the pattern is close to the New Zealand plan. No anaesthesia is used. The reason presented is that the child has more fear of the needle than of the actual operative procedure. They firmly believe that the child can be coerced and apparently have no such problem as the "difficult" child. I saw many instances and was surprised at the stoic acceptance by the children. Perhaps this stoicism is helped by the fact that there is very little extension for prevention and practically no prophylactic odontotomy. The choice of filling material in primary teeth is oxyphosphate of zinc cement with occasional use of copper or silver amalgam. Much stress is placed on the theory of retaining primary teeth for as long as possible except in the cases of rheumatic children where extensively carious teeth are routinely extracted. The principle of extracting teeth to remove foci of infection has exacted an extensive toll of teeth in both children and adults. The replacement of primary second molars in a child age four to five is very rare and then only after the eruption of the permanent first molar. Fixed space maintainers were not seen in any of the areas visited.

In primary teeth, with small carious exposures, pulps are covered with a mixture of penicillin and biomycin in the hope of keeping their vitality. In some instances, pulpotomy is attempted using a mixture of white clay with an emulsion of penicillin in oil and sulfathiazole. This mixture is also used in fractured young permanent anterior teeth, but the pulp is removed to a greater extent but short of the apex. Penicillin is also injected periapically. This technique is also used in complete root therapy for permanent fully formed teeth. The collection of x-rays which were shown to me were only those of adults and the results were good. Incidentally, rubber dam is never used and when asked why, the answer was "It is the custom, and we have no precedent." In those cases of advanced pulp involvement, a mixture of iodoform paste and triopaste is used after an extensive pulpotomy. In some clinics experiments are being tried using either 5-10 per cent formalin or trioxymethyline 5 gr. plus white clay 40 per cent and creoline 2-3 gr. Results could not be verified. If the child does not complain, an x-ray check-up is not made. Percentages of success or failure were not available but the claim is made that it lasts for years and that they have good results. Of course, "the younger the child, the better the results." In these instances, periapical injections of penicillin are given (from 2,500 units per cc and up).

In closing, I must comment on my reaction to the changing scene which is apparently taking place in Russian dentistry. The rise in the status of the stomatologist has had a deteriorating effect on

the everyday practice of general dentistry. More surgery is done in more areas of the head and neck, but the restorative practice of dentistry—not only in the operative field, but in the prosthetic field, both fixed and removable showed a definite and serious deterioration. In a country where so much has already been accomplished and where there is no restriction on finances for research; where funds are readily available, progressive growth of dental practices should also be more visible. I would heartily recommend an exchange program to help stimulate their research and growth. This could be mutually beneficial. There is a great deal of skepticism regarding the accomplishments of the West, and yet they are striving hard to reach and even to surpass us.

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Dental Findings in Cerebral Palsy

JASON C. SIEGEL, D.M.D.

I. PURPOSE

WITHIN the past five years total dental treatment of cerebral palsy children has become a routine procedure in many clinics throughout the country. Many articles have appeared in the journals regarding operative technique, treatment under general anesthesia, drugs, psychological background, and in general, the practical applications for improving the dental health of the child with cerebral palsy.

However, very little investigation has been reported on possible diagnostic clues to cerebral palsy from the appearance of the dentition or the supporting tissues.

This report is concerned with the type of dentition and the supporting tissue found in cerebral palsy children. There are two important factors to be considered: (1) Does cerebral palsy, especially when it is of pre-natal etiology, have any effect on the dentition and the supporting structures? and (2) can the clinical examination of the dentition become a diagnostic aid in determining the cause of cerebral palsy?

The purpose of tabulating the high arch palate, dental anomalies, and decalcification and hypoplasia was to determine whether cerebral palsy of pre-natal or anoxia stress etiology would have any effect on the dentition and the supporting structures. It was felt that if any significant results were found in this study, they would be diagnostic aids in fixing cerebral palsy on pre-natal influence.

A study of the normality or abnormality of eruption with regard to chronological dates was made so that the findings could be of some value in determining whether the suspected hypothesis that cerebral palsy youngsters are hypometabolic could be substantiated by comparing the eruption dates of cerebral palsy youngsters with normal siblings.

II. METHOD

Sixty-five cerebral palsy children and sixty-five youngsters in a control group were examined. Fifty-three of the cerebral palsy cases were mild, and twelve cases were severely retarded. Both the cerebral palsy and the normal group ranged in age from 2-12.

The youngsters were divided in the 2-5 and 6-12 age groups (see Table I) so that the studies could be made on the primary, mixed and permanent dentitions. It was felt that by virtue of growth and development factors it would be necessary to divide the children chronologically.

TABLE 1

Group A (Age 2-5)		*Group B (Age 6-12)*	
C. P.	28	C. P.	37
Normal	28	Normal	37
Total	56	Total	74

All those included in the study were examined clinically. Neither x-rays nor study casts were utilized.

The following examinations were done:

1. High Arch Palate

The cerebral palsy and normal groups were examined clinically to determine what percentage had high arch palates.

For practical purposes the height of the palate was graded on the basis of four categories: I—very low, II—average, III—moderately high arch, IV—an extremely high vault. Admittedly, this was not a scientific method to determine the height of the palate. However, since alginate impressions would be needed for each case (and even then grading the height of the palate would be an arbitrary method) it was felt that the clinical examination would suffice for a pilot study.

2. Attrition

Attrition is the excessive wearing away of the occlusal surface of the tooth producing a flat cuspal plane. It is caused by the excessive intra-oral forces such as grinding and is aided by eccentric muscular action. This subject was included to determine whether or not intra-oral forces causing attrition were peculiar to cerebral palsy children. Particular attention was paid to the posterior dentition or molar areas.

3. Cerebral Palsy and Dental Caries

The DMF's (decayed, missing and filled) of the normal and cerebral palsy groups were determined by clinical examinations.

4. Chronological Normality of Eruption

The number of children examined in this area of our study was the same as in the previous series.

It is understood that it is very difficult to employ the term "normal" when we wish to discuss eruption dates in relation to chronological age. The term "average" is always employed to better advantage in this phase of dental study. However, there are certain deviations in eruption sequence that stray so far from the "average" that we are safe in employing the term "abnormal."

The criteria used in determining whether or not eruption was abnormal were the eruption dates of the primary cuspids and first molars and the stage of eruption of the second primary molars.

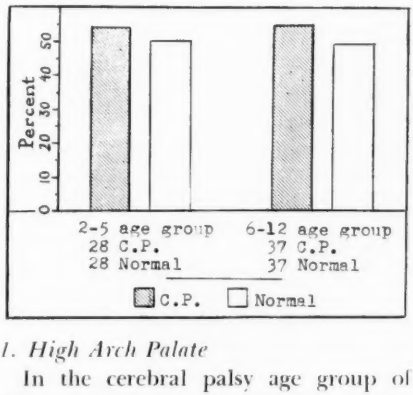
5. Decalcification and Hypoplasia

The cerebral palsy and normal groups were examined clinically for enamel hypoplasia, decalcification, and any other enamel dyscrasias that could be observed.

6. Anomalies—Developmental

The same number of children were examined in each age group in both the normal and cerebral palsy as in previous sections of this study. The examinations for anomalies were clinical.

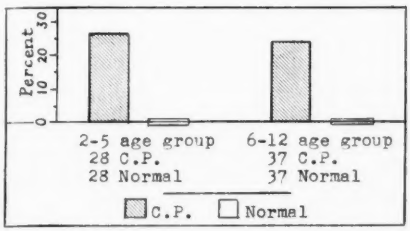
III. Results



1. High Arch Palate

In the cerebral palsy age group of 2-5, a total of 15 youngsters were in the III-IV categories, or 54 per cent had a high arch palate. In the same age group 28 normal children were examined; 14 were placed in the high arch classification for a percentage of 50 per cent. In the 6-12 age group, 20 out of 37 children were in the III-IV groups for a total of 54.2 per cent. In the same age group the percentage of normal children having the high arch palate was slightly lower, or about 49 per cent.

2. Attrition



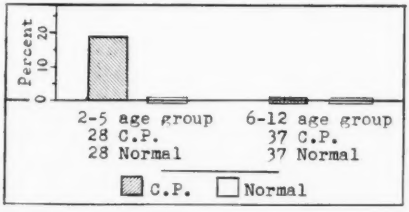
Not a single case of attrition was found in the normal group. Of the 65 C.P. youngsters examined, a total of 18 or 27.8 per cent showed definite signs of attrition. Four cases were slight; fourteen were marked or severe. Only four youngsters in the severe attrition classification were diagnosed as athetoids.

3. Cerebral Palsy and Dental Caries

The cerebral palsy children in the 2-5 group had a DMF of 5.9. The normal youngsters in the same age group had a DMF of 5.4.

In the 6-12, or mixed dentition stage, the cerebral palsy and normal children both emerged with exactly the same DMF of 6.7.

4. Chronological Normality of Eruption



In the normal groups there was not a single case that strayed so far from the average that it could be called abnormal; this was true in both the 2-5 and 6-12 groups.

In the cerebral palsy group there were no abnormalities in the 6-12 age level. In the 2-5 age category 28 siblings were examined and the eruption dates of 5 children or 18 per cent had deviated far enough from the average to be called abnormal. All five children were at least 30 months old. The second primary molars had not erupted in any of the five abnormal cases. In three of the cases, the upper cuspids and first primary molars were partially erupted. These children ranged in age from 30-40 months.

5. Decalcification and Hypoplasia

In the cerebral palsy group a total of 6 children showed decalcification or hypoplasia. Four youngsters were in the 2-5 age group. The hypoplasia in two cases was found on the anterior primary teeth in the area of the incisal third of the tooth. A third youngster showed hypoplasia on the gingival third of the anterior primary teeth and along the gingival margins of both the first and second primary molars. In the fourth case, which was diagnosed as a severe spastic quadriplegia along with mental retardation, hypoplasia and decalcification were prevalent throughout the dentition. One enamel dyscrasia was certainly evident; and amelogenesis imperfecta was suspected in one case.

The pattern of hypoplasia that occurred in the 6-12 age group was similar. In both cases chalky hypoplastic areas were found in the incisal third of the upper central incisors and the occlusal cusps of the upper and lower first permanent molars.

In the normal control group, 3 children showed evidence of hypoplasia. All three were in the 6-12 age group, and all gave evidence of hypoplastic areas in the incisal third of the central incisors.

6. Anomalies—Developmental

The percentage of anomalies in both the cerebral palsy and normal groups was about the same. In the cerebral palsy group not a single case of anodontia or supernumerary teeth was found; one child in the 2-5 age group had what appeared to be either amelogenesis imperfecta or dentinogenesis imperfecta. There was not a single case of microdontia or Hutchinson's incisors.

There was one case of supernumerary teeth and that was found in the 6-12 age group of the normal children. In the same age group one of the cerebral palsy children, age 10, had retained primary lateral incisors. The permanent lateral incisors were congenitally missing, but this was a congenital anomaly and not a developmental one.

In three cases in the 6-12 age group amongst the cerebral palsy youngsters there was excessive spacing between the teeth; the growth of the alveolar process in most cases was excessive.

IV. Discussion

1. High Arch Palate

Koster and Seymour[1] suggest that a high and narrow palatal vault is seen most often in athetoids and quite frequently in spastics. However, the forces that may cause a high arch vault are due to local environmental conditions such as tongue thrust and preversion of muscular action on the dentoalveolar structures and not as a result of pre-natal anoxia.

2. Attrition

Our study shows that marked attrition is not peculiar to athetosis. It is interesting to note that those siblings showing the most marked attrition had the most severe cases of cerebral palsy and had suffered the most severe brain damage. Age was not a factor. In the total of 18 showing attrition, nine were in the 2-5 group and nine were in the 6-12 status. Newly erupted permanent molars, however, had not been in the arch long enough to show the effects of excessive grinding.

3. Cerebral Palsy and Dental Caries

A study of the DMF was made to determine whether there was an inherent weakness in tooth structure due to pre-natal or anoxia-stress etiology. The work done in this study shows that the rate of caries incidence is almost exactly the same for normal and cerebral palsy youngsters, and that even the local environmental factors had no influence on the rate of decay in cerebral palsy children.

4. Chronological Normality of Eruption

Some investigators feel[2] that cerebral palsy children, especially in the early stages, show definite signs of hypometabolism. Wrist plate x-rays had been taken for the five children in question to determine their bone age. In three of the x-rays a delayed bone age was discovered. It would be interesting to carry on this study with far greater numbers employed. The figures we have are too small to be of any value. Delayed eruption might conceivably be of some diagnostic value in proving hypometabolism in normal or cerebral palsy children, especially if followed up with wrist plate x-rays.

5. Decalcification and Hypoplasia

The findings of hypoplastic and decalcification areas on the primary dentition is, of course, very significant because hypoplasia in itself is evidence of a systemic upset. A link between brain insult

and systemic upset might be made. The location of the decalcified areas on the tooth is important. For instance, if hypoplasia is found along the incisal third of the primary incisors, we may determine that some systemic upset occurred very early in utero, since formation of the primary incisors begins during the second and fourth month in utero. The systemic upset and brain insult could be linked and the hypoplastic area could be evidence as to when brain damage occurred. If hypoplasia is found on the permanent six year molars in a cerebral palsy child, brain damage could have occurred at birth or in the post-natal stage.

6. Anomalies—Developmental

The study of developmental anomalies was undertaken to determine whether or not pre-natal or anoxia-stress etiology in cerebral palsy would be a causative factor in developmental anomalies. It is known that aberrations in the initiation of tooth-germ development result in an abnormal number of teeth or in abnormal conditions of the teeth.

V. Conclusions

1. High Arch Palate

The presence of a high arch palate was not found to be a reliable diagnostic aid as far as determining whether or not brain insult was of pre-natal anoxia stress etiology. The result in the cerebral palsy group was only a few percentage points higher than the normal group. Hereditary factors are important; also the abnormal hypertonic condition of the facial muscles, involuntary pernicious intra-oral habits, and the general perversion of the muscular action all play a role in creating a high arch palate. These, however, are postnatal or environmental factors and are not developmental. Koster[3] and Jackson[4] both found the high arch palate to be almost universal with athetosis. Malocclusions were also most prevalent in this group.

2. Attrition

Attrition, or the grinding away of the cuspal plane, was found to be quite prevalent in the cerebral palsy group and non-existent in the normal group. The degree of the attrition depended upon the severity of the cerebral palsy. It was not peculiar to athetoids; attrition was not limited to any age group. If the cerebral palsy was severe enough, it was just as prevalent amongst spastics as athetoids. Hypertonicity of the muscles of mastication and the erratic action of the facial musculature are the causative factors.

3. Cerebral Palsy and Dental Caries

Weisman[5] in his study at Columbia found that a majority of cerebral palsy children had poor oral hygiene.

There was hardly any difference in the DMF between the cerebral palsy group and the normal. This was surprising because many of the children in the cerebral palsy group are on soft mushy diets because they are unable to chew solids. Oral hygiene within this group is generally poor. The normal group was from a low socio-economic class. This might tend to equalize the above factors.

4. Chronological Normality of Eruption

The eruption sequence of our study produced some interesting findings. In the normal group, there was not a single abnormality as far as chronological eruption dates were concerned. This also can be said for the 6-12 group of the cerebral palsy group. In the 2-5 age group of the cerebral palsy children, there were some abnormalities in eruption sequence. Five children showed definite deviations from

the average for a total of 18 per cent. Some investigators[6] feel that cerebral palsy children, especially in the early stages, show definite signs of hypometabolism. If subsequent research bears this out, then delayed eruption could be a reliable diagnostic aid as far as hypometabolism is concerned. Wrist plates should always be taken on cerebral palsy children. It is certainly worthwhile from a research point of view to further study the relationship between abnormal eruption sequence and bone age in cerebral palsy children to find a clue as to whether or not there is endocrine dysfunction.

5. Decalcification and Hypoplasia

Decalcified and hypoplastic areas on the primary teeth could be an important diagnostic aid in determining whether or not the cerebral palsy was of pre-natal anoxia stress etiology. If the decalcified areas are found on permanent teeth, it may mean that the brain insult occurred at birth or was post-natal. If the decalcified or hypoplastic areas are found on the anterior primary teeth in cerebral palsy children, it could mean that the brain damage was pre-natal; this information would aid in substantiating the known medical history.

The results in this phase of study were higher in the cerebral palsy group than in the normal group, but there was not enough difference to draw any conclusive results. Certainly, this phase of the study deserves a great deal more investigation.

6. Anomalies—Developmental

There was nothing of significance found in our study of developmental anomalies. Any aberrations of development which were discovered were of congenital origin and were not developmental. The percentage of anomalies in both the cerebral palsy and normal groups was about the same.

VI. Summary

1. Decalcification and hypoplasia are the most important diagnostic aids in determining when brain insult occurred.

2. Eruption abnormalities were found in 18 per cent of the 2-5 age group in the cerebral palsy group. The bone age was retarded in three cases. There is a need for further research in this phase of our study.

3. Attrition of varying degrees was found in almost a third of the cerebral palsy group. It was not peculiar to athetosis. Attrition was not found in the normal group.

4. Most investigators feel that the height of the palatal arch is determined by environmental circumstances, not developmental. This was brought out in our study where the percentages of high arch palates in the cerebral palsy and normal groups were almost identical. There is no apparent link between brain damage and the high arch palate.

5. Developmental anomalies of the dentition are not significant as far as cerebral palsy is concerned.

6. The DMF's of both cerebral palsy and normal groups were about the same. This result was unexpected.

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THE WHITE HOUSE CONFERENCE ON CHILDREN AND YOUTH

A Report by M. Joel Freedman

The representatives of the American Society of Dentistry for Children to the White House Conference on Children and Youth held in Washington, D. C. from March 27 to April 2, 1960 were Doctors Paul Weber and M. Joel Freedman. The White House Conference, first called by President Theodore Roosevelt in 1909, has been held every ten years thereafter. This was the Golden Anniversary Conference. Detailed reports by the A.S.D.C. representatives were made to the ad interim meeting of the Executive Council in Chicago on June 3 and 4 and can be found in the minutes of that meeting. The report which follows is necessarily brief, but will convey some of the proceedings of the Conference as they relate to the A.S.D.C.

The Conference is a representative meeting of citizens representing many groups and professions, who share a deep concern for children and youth. The delegates (7,000 in all) were invited by President Eisenhower on recommendation of the Committee on Invitations and Credentials of the President's National Committee. Conference participants included nominees of State Committees and National Organizations, 900 young people, public officials, 500 international guests, and committee members.

The theme of the Conference was "To Promote Opportunities for Children and Youth to Realize Their Full Potential for a Creative Life in Freedom and Dignity." Prior to the Conference millions of citizens together with private and public agencies at local, state and national levels developed the groundwork for the Conference through surveys, studies, workshops, town meetings, opinion polls and "little" White House conferences. Delegates received some remarkable publications of books and working papers containing research and statistics pertaining to children and youth. Among these were a volume entitled *Focus on Children and Youth, the Report of National Organizations;* another called *The States' Report on Children and Youth;* a book of charts entitled *Children in a Changing World;* survey papers entitled *Children and Youth in the 1960's*, and three volumes edited by Eli Ginzberg entitled *The Nation's Children*. Of these, the first volume was on the family and social change, the second on development and education and the third on problems and prospects. These books are now available to the public at large. A pamphlet received about the middle of June was also published. This contains the recommendations and composite report of forum findings of the White House Conference.

Delegates were assigned to specified theme assemblies, forums and work groups, according to the interest they had indicated before the Conference. Assignments were made by means of an IBM machine, so that each work group was composed of people with varying backgrounds and interests.

The same topics were covered at all the theme assemblies: Children and Youth 1960. On Monday they considered "Appraising ideals and values in their changing world," on Tuesday "Assessing the impact on them of economic, social and cultural factors," and on Wednesday "Adapting to change and innovation—the effects on them of science, technology, population pressures and world events."

Dr. Weber's assignment after the theme assembly led him to Forum 10, "Moving toward maturity—birth to puberty" and "Care and training of body, mind and emotions." He then joined the work group dealing with the normal child age 2 to 6 years. One topic to be considered by this work group was correction of defects—medical, dental, visual, audio. The scope of this report does not permit the inclusion of all the topics covered and all the views expressed. It is of special interest, however, to note what Dr. Weber presented to the work group on behalf of Dentistry. He stressed early dental examination, to include all the latest (and some of the yet unknown)

concepts of growth and development. The early interception and correction of any defects, including caries, interceptive orthodontics, malocclusion, as it may affect speech, facial growth and contour, including abnormalities as cleft lip or palate. He stressed that continued care is necessary to prevent breakdown of treatments.

The recommendations from this work group, No. 102, covered the following items: Nutrition, fluoridation, early dental examination and correction of defects; eye; auditory; speech; cooperation of all professional personnel, teachers, etc. in early childhood; immunization with booster shots; medical and dental examinations every six months; guidance in physical and emotional growth and development; records for mobile family units; accident education—mobile and poisons; "fads" in advertising to be discredited; pre-school evaluation of behavior problems to prevent delinquencies; baby sitters' responsibilities and infectious standards be assured; research and study for experience at all ages, to replace acceptance at chronological ages; teams of specialists to coordinate data on growth and development; all recommendations to be followed through until the next White House Conference on children and youth.

Dr. Freedman was assigned to the work group on mass media of information. He expressed this as one of his interests, because he considers the knowledge of this field of major importance to the dental profession in the conveying of how best to use these media to present dental information. Dental health education for children and parents reaches the public through various media. Among these are radio, television, motion pictures, booklets, pamphlets, newspapers and magazines. Vast sums are spent and untold energies expended upon the production of these materials and the acquisition of time and space for the dissemination of the message of dental health, yet there is still no agreement as to the effectiveness of these media in obtaining the ends desired—motivation toward better health habits and toward seeking health services. In the course of the discussion he pointed out that there are many spot announcements and other advertising materials that give actual misinformation in the field of dental health. The public should be made wary of medical and other types of advertising which are so worded as to lend themselves to misinterpretation. He recommended to the work group that in all studies the child as a whole should be considered, not just specific aspects as determined by our own special interest or field. The recommendations made by this work group are many. Several of them should be noted here. One, that the President of the United States appoint a high level advisory board to make recommendations on radio and television program content, especially as it affects children and youth. Two, that schools, religious groups and civic organizations give more emphasis to evaluating television and radio programs. Three, that state committees of the White House Conference bring together all interested community organizations as a council to conduct courses in selection and use of TV and radio and other mass media, and to serve as a clearing house and resource center for gathering and disseminating information and correlating projects. Four, that the mass media adopt a code of criteria for accepting advertising in connection with entertainment films. Five, that community forces such as the family, the church, the school, youth agencies and governmental agencies encourage the mass media to produce materials in harmony with their objectives, and to recognize their responsibility for influencing sensitive adolescent minds by presenting the contributions made by persons of high integrity.

Some of the recommendations which came out of the work group which Dr. Weber attended were as follows: That periodic examination and continuous medical and dental care, including vision, hearing and lingual problems, early detection and treatment of defects and abnormalities as well as the prevention and early treatment of disease be provided for all children, including those of mobile families. That studies, programs and facilities for the medical and dental care of adolescents and the supervision of their general health be planned in accordance with their special needs and characteristics, since the number of disqualifications for military service indicates an

urgent need for improvement of their physical, mental and social fitness. 3. That communities provide the fullest possible protection against tooth decay by the fluoridation of water supplies. 4. That communities provide early instruction to parents on development of the jaw and eruption and care of the teeth to prevent many facial disharmonies with resulting emotional and physical health hazards. 5. That physicians, residents, interns, medical students and nurses be helped to recognize the needs of the patient as a total person, especially the needs of infants and young children for play and for contact with parents; and that they be given training by specialists in problems of family relations and family disorganization. 6. That the public be informed through television, radio and other mass media of the health needs of the unemployed. 7. That information programs be developed to: a. educate adolescents in sound nutritional attitudes and practices. b. emphasize to adolescent girls the importance of nutrition in preparation for motherhood. c. inform parents and others in charge of feeding children of nutritional requirements as recommended by professional authorities for the growth and development of children. d. alert parents to the dangers of fad diets and excessive intake of certain vitamins and supplements or health foods. 8. That enthusiastic young adults who have recently entered the health service professions undertake a program to interest youth in the field. 9. That educational opportunities in all the health professions (including medicine, nursing, public health, mental health and social services) be expanded with the use of federal and state funds to supplement private and local funds.

The recommendations which Dr. Weber and Dr. Freedman specifically make to the A.S.D.C. are as follows: 1. That the A.S.D.C. assume the obligations and follow through on the Council of National Organizations for the White House Conference for Children and Youth. 2. A voluntary donation might be in order; the sum might be determined later through cooperation with the A.D.A., the American Association of Orthodontists, the American Academy of Pediatrics and the A.M.A. 3. That a committee be set up of at least five members which could study and report on all the materials available, and how best A.S.D.C. could play its part. 4. That a liaison be established with the American Academy of Pediatrics and that we base further study and work with them and the A.D.A. and the Orthodontic group on educational material on growth and development that might be of mutual interest. 5. That one or more members be "groomed" for attendance during the next White House Conference on Children and Youth. They could conceivably be members of the committee if so desired by A.S.D.C. 6. The A.S.D.C. should have a liaison with all groups interested in children and youth, not solely with the groups concerned with health. It is only when we come in contact with the other workers in the field that we realize how many influences affect youth, and therefore affect our work with children and youth. 7. Articles on different findings of this Conference on all phases of children and youth should be published as a series in the A.S.D.C. *Journal*, so that each member will get a full picture of the problems and the research to date. 8. The A.S.D.C. should buy several copies of the publications which emanate from the White House Conference, and make them available to members on a loan basis, so as to disseminate the information that appears in these remarkable books. 9. That the A.S.D.C. at its national meeting adopt a resolution to the effect that because the program of the A.S.D.C. is in harmony with the stated purpose of the White House Conference, which is "to promote opportunities for children and youth to realize their full potential for a creative life in freedom and dignity" that the A.S.D.C. commend the President of the United States for calling the Conference, congratulate the planning committee for the development of a significant program to consider the needs of children and youth, and that the A.S.D.C. consider the recommendations emanating from the Conference in regard to the dental health of children and youth, and continue to work in the spirit of the Conference for the welfare of children and youth.

EDITOR'S NOTE:

The following brief reports were presented before the American Academy of Pedodontics at its Annual Meeting held in St. Louis. They have been offered for publication in our JOURNAL *by the then Editor of the Academy.*

A.E.S.

EFFECTS OF SILVER NITRATE ON HUMAN PULP

PURPOSE: To re-evaluate effects of silver nitrate on pulps under intact and carious dentin and on exposed human pulps.

METHOD AND MATERIALS: Silver nitrate (Howe's ammoniacal) was applied for 3 minutes to 16 non-carious and 6 carious tooth cavities and to 15 exposed pulps. The teeth were extracted 1, 7 and 30 days later and subjected to routine histologic analysis with special care taken to insure good fixation.

FINDINGS: Much greater damage was observed to pulps under carious and non-carious cavities than previously reported. Damage was characterized by hemorrhage under all cavities deeper than half the thickness of dentin and was very severe under deep cavities. Recovery was the rule after 30 days, by walling off the injured area.

Damage to *exposed* pulps was surprisingly slight. In all cases, the action of the silver nitrate was neutralized by precipitation of silver by the red blood cells, thus limiting the action of the silver nitrate and preventing its penetration deeper into the pulp. There was less damage under exposed pulps than under intact non-carious or carious cavities.

MAURY MASSLER, *Chicago, Ill.*

THERMAL CHANGES IN CHILDREN'S TEETH DURING CAVITY PREPARATION

PURPOSE: To report thermal changes in children's teeth during cavity preparation in vivo under controlled conditions of operating. The principle of the thermocouple and its use in determining heat measurements were also presented.

MATERIALS AND METHODS: The following variables were controlled—speed of revolving instrument, distance of the bur from the thermocouple, type and amount of pressure and type of bur. Findings were limited to effects of coolants on the temperature produced during operative procedures.

FINDINGS:

1. The actual temperatures of teeth are lower than the 98.6° F., ordinarily accepted as normal body temperature.
2. The rise in temperatures produced in a tooth by a revolving bur was decreased considerably when a coolant was used.
3. The water coolant is more effective than the air coolant in decreasing the temperature in a tooth during cutting.
4. Thermal changes recorded in vital teeth being cut by revolving instruments were consistently lower than the temperature readings recorded for the same operation in extracted teeth.
5. The use of coolants appears to afford a better visibility of the cavity and to prevent the revolving bur from becoming clogged.

ZALMAN KONIKOW, *Royal Oak, Mich.*

A CLINICAL AND ROENTGENOGRAPHIC EVALUATION OF THE EFFECTIVENESS OF CALCIUM HYDROXIDE IN VITAL PULP THERAPY

PURPOSE: To study and assess results of using calcium hydroxide over vital pulp exposures in 266 teeth (231 primary molars; 33 permanent molars; 2 permanent fractured incisors).

METHOD AND MATERIALS: 246 teeth were followed over a period of one to 5 years with a few cases observed for six and seven years. Twenty teeth were followed for six to nine months.

During the latter part of 1956, this procedure was modified somewhat. When a carious exposure was anticipated, zinc oxide and eugenol paste was first placed after the partial removal of caries and left in situ for about four days before the exposure was made.

FINDINGS: Of the 266 cases, 26 were listed as failures. Eight of the 266 (approximately 3 per cent) were marked "early" failures since they occurred within the first twelve months after treatment. Eighteen of the 266 (approximately 6.8 per cent) were marked "eventual" failures since they deteriorated only after twelve months had passed. Of the 26 failures, 8 primary molars were maintained until the premolar erupted in good position; 13 are being maintained and the outcome is not yet known; 4 primary molars were extracted; 1 permanent molar required a root canal filling. After the procedure was modified in 1956, there have been no failures. It raised the percentage of success, but the total number of teeth treated in this manner is still small. This study presents only the clinical effectiveness of calcium hydroxide in vital pulp therapy. It shows that this procedure was successful in approximately 90 per cent of teeth treated.

MARY LYNN MORGAN, *Atlanta, Ga.*

PRELIMINARY REPORT ON THE USE OF CALCIUM HYDROXIDE AS AN INDIRECT PULP CAPPING MATERIAL

PURPOSE: To obtain clinical evidence as to the effectiveness of indirect pulp capping with calcium hydroxide.

METHODS AND MATERIALS: The teeth selected for the study were permanent first molars in children 8 to 12 years of age with large carious lesions where complete removal of all caries would result in pulp exposure. The large bulk of caries was removed until it was felt that further excavation would result in pulp exposure. A creamy mix of calcium hydroxide and water was placed over the remaining caries to a thickness of 1.0 mm., blotted dry with cotton, and the cavity filled with a thick mix of zinc oxide and eugenol. The cavity was reopened after three months and all zinc oxide-eugenol, calcium hydroxide, and remaining caries removed.

FINDINGS: Of 26 permanent first molars treated with this procedure 5 showed pulp exposures after re-opening while 21 (80 per cent) showed hard reparative dentin covering the pulp when the remaining caries was removed after three months.

CHARLES MEHLUM, *Phoenix, Arizona*

REDUCTION OF CARIES BY A SODIUM FLUORIDE MOUTHWASH

PURPOSE: To determine effectiveness of a ¼ per cent sodium fluoride mouthwash used by children in a private pedodontic practice.

METHODS AND MATERIALS: Because of the limited number of patients available, very strict and rigid specifications were set up to observe the results from the maximum number of available surfaces. This automatically eliminated all primary teeth. Only non-carious permanent teeth were taken into consideration. Five and six year olds were studied to get the long range view over periods of 8 to 10 years, while eight and nine year olds were studied over the comparatively short time of 2 to 4 years.

The experimental group consisted of five and six years olds, and eight and nine year olds with rampant decay in whom the original high lactobacillus count was reduced and kept low by continuous use of the mouthwash. The control group consisted of five and six year olds, and eight and nine year olds, with high or low lactobacillus counts. These received good pedodontic procedures comparable to the experimental group but received no mouthwash.

FINDINGS: In a group of 212 children receiving a sodium floride mouthwash, it was observed that after 2 years, a significant reduction of caries occurred in the permanent teeth. In the 5-6 year old group the reduction was 85.7 per cent after 2 years; after 4 years, 83.1 per cent; after 6 years, 88.5 per cent; after 8 years, 88.1 per cent; and 10 years, 88.5 per cent. The reduction of caries in the 8-9 year old group after 2 years was 92.2 per cent and after 4 years, 87.1 per cent. It was also observed that in children with caries free mouths and a consistently low lactobacillus count, when the count was raised by the use of the mouthwash, a high caries rate usually was the result.

WALTER S. WEISZ, *Pittsburgh, Pa.*

THE INCIDENCE OF ACCIDENTAL INJURY TO PRIMARY ANTERIOR TEETH

PURPOSE: To determine a percentage of children who suffered injury to their anterior primary teeth.

METHODS AND MATERIALS: During the 2 year period from June, 1956 to May, 1957 every child under 6 years of age who came into this office was checked for teeth that had been injured accidentally. For the purpose of this report, each child was examined only on the initial visit during this period and only by visual means. Conditions checked were teeth that were missing, non-vital, fractured, chipped, knocked out of position, or those with a fistula.

FINDINGS: Of the 408 children observed, 221 (54.14 per cent) had suffered injury to anterior primary teeth. Two hundred and eight (94.2 per cent) had only maxillary teeth involved, 7 (3.1 per cent) had only mandibular teeth involved, and 6 (2.7 per cent) had injured both maxillary and mandibular teeth.

The 221 children with involved teeth had a total of 375 teeth that had been injured. One hundred and twelve (50.7 per cent) had only one tooth involved, while 74 (33.5 per cent) had two, 26 (11.8 per cent) had three, 8 (3.6 per cent) had four and 1 (0.4 per cent) had five teeth involved.

R. D. KORNS, *Joplin, Mo.*

SAFETY OF GENERAL ANESTHESIA IN A PRIVATE PRACTICE

PURPOSE: To study the safety, economy and practicability of the use of general anesthesia for the dental treatment of uncooperative children in a private practice.

MATERIALS: The records of two hundred consecutive and unselected children treated over a period of eight years were analyzed. All children were excessively fearful, emotionally disturbed or mentally retarded. They ranged in age from 2½ to 21 years.

METHODS: Each child was carefully examined by a physician and premedicated with Meperidine plus Atropine Sulfate. Anesthesia was induced by a registered anesthesiologist using intravenous thiopental sodium 0.4 per cent in glucose. Succinylcholine chloride was used as a muscle relaxant for the reception of the nasotracheal airway after which the patient was maintained on an open system with 75 per cent nitrous oxide and 25 per cent oxygen. Thiopental sodium and succinylcholine chloride were continued by drip during the operation, as needed.

FINDINGS: In 200 children 1,673 amalgams and 51 crowns were placed in addition to 377 extractions, 88 pulpotomies and 21 gingivectomy quadrants. The quality of the restorations was equal to or superior to those placed by this operator in cooperative patients under local anesthesia. These services were accomplished under conditions of optimal safety comparable to those available under hospital conditions, and at a cost but little higher than for cooperative children. The total cost was a substantial savings to the parents since the high cost of hospitalization was eliminated. Most important, 200 handicapped and uncooperative children received *optimal* dental care; children who otherwise could not have been cared for at all because of limitations in hospital facilities in a middle class suburban community.

WAYNE DUNNOM, *Oak Park, Ill.*

Abstracts

THE RELATIONSHIP BETWEEN LACTOBACILLUS COUNTS, SNYDER TESTS AND THE SUBSEQUENT INCIDENCE OF DENTAL CARIES—G. N. Davies, R. M. King, and A. A. Collins, Univ. of Otago Dental School, Dunedin, New Zealand: Arch. Oral Biol., Vol. 1, No. 1, P. 62-73, 1959, Pergaman Press Ltd., Great Britain.

A study was conducted to determine the relationship between lactobacillus counts, Snyder tests and the number of newly decayed tooth surfaces in 584 patients from age 3-31 years.

The results from each test were similar. The clinical examination consisted of drying each tooth with compressed air and utilizing a mirror and explorer. Bite-wing radiographs were taken for all patients. Specimens of saliva were collected in sterile sample bottles from each patient on two or three successive mornings following the initial clinical examination.

Both lactobacillus counts and Snyder tests predicted the incidence of dental caries more accurately in the young children aged 3-13 years than in the older patients aged 12-31 years. Those patients with strongly positive tests had a higher number of at least 3 or more new lesions in 12 months, or less than did patients with negative tests. Neither test was reliable for predicting the incidence of caries over a period of time exceeding one year.

M. M. ALBUM

A COMPARISON OF THE INCREMENT OF FLUORIDE IN ENAMEL AND THE REDUCTION IN DENTAL CARIES RESULTING FROM TOPICAL FLUORIDE APPLICATIONS—I. Sundvall-Hagland, F. Brudevald, W. D. Armstrong, D. E. Gardner, and F. A. Smith: Arch. Oral Biol. Vol. 1, No. 1, P. 74-79, 1959, Pergaman Press Ltd., Great Britain.

Primary teeth which had exfoliated during and after topical sodium fluoride 2 per cent applications were collected and analyzed for fluoride content. The experimental group of 107 children with a median age of 2 years and 8 months was used. The teeth on one side (upper and lower) were given 4 topical treatments of 2 per cent sodium fluoride within a period of 15 days, each treatment lasting 4 minutes. The untreated teeth and the teeth of a group of 102 comparable children who received no fluoride treatment served as controls. Dental examinations were given at the beginning of the experiment and 1, 2, and 3 years afterwards.

Caries reduction was 19, 14, and 7.5 per cent when based on a comparison of treated and untreated teeth in the same mouth, and 34, 23, and 12 per cent when teeth of untreated children were used as controls. The exfoliated teeth with fluoride applications when analyzed showed an increase of approximately 50 p.p.m. in the fluoride concentrations of the outer portion of the enamel. The study showed no decrease of fluoride from the treated enamel during the period 3-7 years following fluoride treatment.

M. M. ALBUM

CLEFT LIP AND PALATE IN TWINS AND OFFSPRING OF TWINS—Elizabeth Curtis, M.A., Research Institute of the Hospital for Sick Children, Toronto, Ontario: Paper read before 17th annual meeting of A.A.C.P.R., May 1959.

Animal geneticists have shown the value of environmental and genetic factors in the occurrence of cleft palate in mice. The author feels that although newborn children would have an inclination to create difficulty in evaluating this confusing problem, twin studies do provide a method of evaluation.

Genetic investigations were carried out on 542 patients with cleft lip and/or cleft palate. Sixteen pairs of twins were found in this study. Tests proved 6 to be monozy-

gotic (MZ) and 10 dizygometic (DZ). This group was added to those reported in the literature making a total of 124 twins for analysis.

Dr. Curtis reports that MZ twins with cleft lip (with or without cleft palate) had both twins affected in 43 per cent of the cases. The low percentage of DZ twins in the same group showed that cleft lip (with or without cleft palate) is partially due to genetic factors. However, over 50 per cent of the twin sets had only one twin affected which indicates the penetrance of the gene by some environmental factor.

This most interesting article goes on to say that genetic predisposition alone can cause cleft lip and/or cleft palate. Furthermore that combinations of conditions such as a short palate, abnormal head size or mandibular defects plus a triggering environmental disturbance must be present before the gene can penetrate.

M. M. ALBUM

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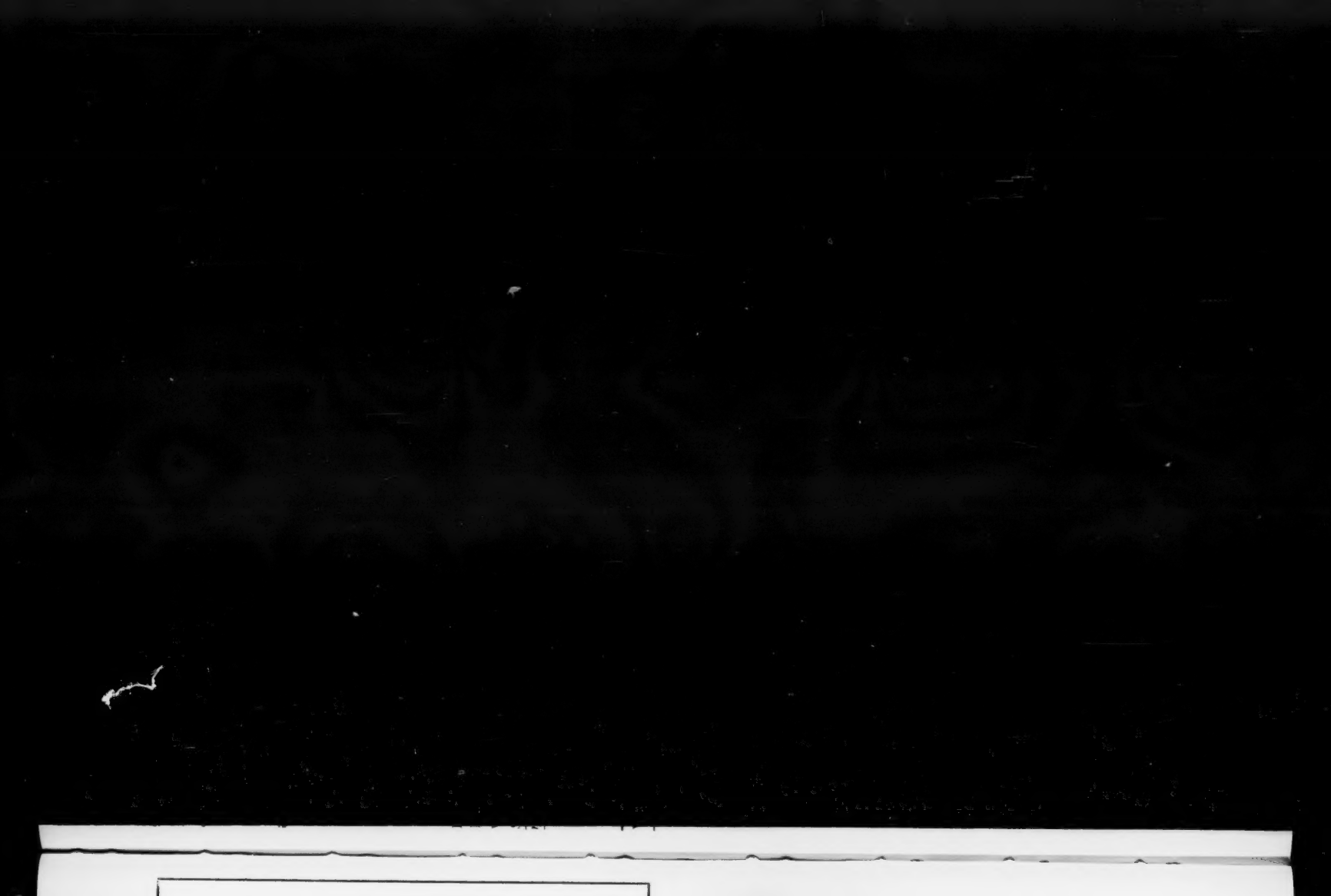
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